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THE PRESENT STATUS OF ANTIBIOTICS IN THERAPY*

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THE importance of antibiotic materials in modern human therapeutics is now well known to everyone. In the few short years that have elapsed since the first successful application of these substances to the treatment of human disease much has been learned, and we now have a considerable fund of information about them and their clinical application.^{1 to 5} Undoubtedly the future will see the development of new preparations and extend the scope of the ones now at hand; but, at the present time, the usefulness and limitations of a few antibiotic materials have been fairly well established.

these substances active against the infective agent in the test tube but some of them possess those characteristics which allow them to exert their specific anti-bacterial effect when administered to human patients.

A large number of such antibiotic substances have been prepared but only a few have the necessary properties of high potency, relative stability, and lack of toxicity to make them satisfactory therapeutic agents. These are shown in the first table and include tyrothricin, penicillin and streptomycin.

TYROTHRIN

Clinically, tyrothricin,^{6, 7, 8} made up largely of a mixture of gramicidin and tyrocidine,^{9, 10} is the least important of the three for, although it exerts an extremely powerful inhibiting action against Gram-positive organisms and is

TABLE I.
ANTIBIOTICS IMPORTANT IN HUMAN THERAPEUTICS

Name	Constituents	Discovered by	Source	Selective action against	Toxicity	Mode of employment
Tyrothricin...	Gramicidin Tyrocidine	Dubos (1939)	<i>B. brevis</i>	Gram positive organisms mainly	Marked	Local only.
Penicillin.....	Penicillins F, G, K, X	Fleming (1929) Florey et al (1940)	<i>Penicillium notatum</i>	Gram positive and some Gram negative organisms	Slight	Topically; local injection; intrathecally; intravenously; intramuscularly; sprays; nebulization; orally. As for penicillin.
Streptomycin.	Streptamine Streptidine	Waksman (1944)	<i>Actinomyces griseus</i>	Gram negative organisms mainly	Slight	

Antibiotics may be defined as substances prepared from the products of metabolism of certain living moulds and other micro-organisms, which are able to exert a powerful antagonistic effect upon the life and growth of specific pathogenic bacteria. The antibiotic treatment of diseases caused by such bacteria has developed from the fact that not only are

capable of controlling experimental infections in mice when administered intraperitoneally, it has been found to be very toxic.¹¹ Given intravenously it causes hæmolysis of the red blood cells, destruction of the leucocytes, liver necrosis and death. When given intramuscularly or subcutaneously, even in small doses, it produces a local sterile abscess and almost completely loses its therapeutic effect. For these reasons its clinical application has been limited entirely to the treatment of ulcers of the skin and other similar superficial lesions. Even in such conditions it is not very success-

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ful for it is inactivated by body fluids, serum and exudates, and it has been largely supplanted by other more effective and less toxic substances. It, therefore, will not be discussed further.

PENICILLIN

Penicillin has been, and still is, the most important member of the antibiotic family. Its ability to control infective processes in the body when employed in the proper method and against infections caused by sensitive organisms is unquestioned. Its lack of toxicity and its effectiveness even in the presence of pus, exudates and tissue autolysates, make it a most useful remedy.^{12, 13, 14}

Selective action on certain bacteria.—In using penicillin it must be remembered that it exerts its action only against susceptible bacteria, and has no action at all upon others. Table II

TABLE II.*
ANTIBIOTIC SENSITIVITY OF COMMON PATHOGENIC
ORGANISMS (IN VITRO TESTS)

A. Sensitive to penicillin	A. Resistant to penicillin but sensitive to streptomycin
Gram negative diplococci	Gram negative bacilli
Meningococcus	B. coli
Gonococcus	B. aerogenes
Gram positive cocci	B. proteus
Staphylococcus albus and aureus	B. pyocyaneus
Hæmolytic streptococcus	B. typhosus
Nonhæmolytic streptococcus	B. paratyphosus
Anaerobic streptococcus	B. dysenteriae
Pneumococcus	B. Friedlanderi
Gram positive bacilli	B. influenzae
B. anthracis	B. pertussis
B. diphtheriae	B. melitensis
B. welchii	B. abortus
B. oedematiens	B. tularensis
B. septicum	Streptococcus faecalis
B. tetani	Acid fast bacilli
B. botulinum	B. tuberculosis
Spirochaetes of:	
Syphilis	
Yaws	
Relapsing fever	
Weil's disease	
Vincent's infection	

*Adapted from Farquharson¹⁵.

(adapted from Farquharson¹⁵) gives a partial list of the sensitive and non-sensitive organisms as determined by *in vitro* tests. This table shows that, with the exception of the Gram negative meningococcus and gonococcus, penicillin acts only on Gram positive cocci, Gram positive bacilli, and upon certain spirochaetal organisms. It has little or no action on Gram negative bacilli, on *Streptococcus faecalis* or upon the

acid-fast organisms of tuberculosis or leprosy.

It must also be remembered that even among the susceptible bacteria there is a wide variation in their sensitivity to penicillin and that certain strains of usually sensitive organisms may be highly resistant. It is necessary, therefore, when treating an infection with penicillin to know the nature of the infecting agent; and it is also highly desirable, if the therapy does not seem to be effective when dealing with what should be a sensitive bacterium, to determine whether or not the organism belongs to a resistant strain.

Another possibility is that an initially sensitive organism may acquire an enhanced resistance to the antibiotic. It is well known that such an increased resistance can be produced *in vitro*,^{16 to 19} but this is not a common feature of organisms studied during the course of a clinical infection.^{20, 21}

Even when dealing with a sensitive organism it is essential for the action of penicillin that it be brought into intimate contact with the pathogenic bacteria. If the organism is growing in blood clot or in dead or gangrenous tissue from which the blood supply is cut off—as it may be in a deep wound or in a chronic osteomyelitis—then the administration of penicillin will have no effect. The need for adequate surgical removal of dead tissue from wounds and of dead sequestra from cases of osteomyelitis is just as great as it has ever been.

It has recently been announced^{22, 23} that there are at least four different kinds of penicillin—known in America as penicillin F, G, K and X—and it has been shown that not only is there a difference in the *in vitro* antibiotic activity of these various penicillins, but there is also a much greater difference in their ability to deal with infections in the living animal. This is most marked in the case of penicillin K whose activities against streptococcal and pneumococcal infection in mice and against experimental syphilitic infections in rabbits is no more than one-sixth to one-tenth of that of standard penicillin G.²⁴ The reason for this is that penicillin K is destroyed in the body much more rapidly than the others,²⁴ and as a result the administration of a given amount of it produces a far lower blood level of antibiotic activity than would the same amount of penicillin G. Because of changes in

the method of manufacture, there has been a gradual increase over the last few years in the K content of most of the commercial penicillins.²⁵ Although successful attempts are now being made to limit the amount of penicillin K in these commercial products, this change has been so significant that the most recent communication from the American Committee on Medical Research has suggested substantial increase in the dose of penicillin prescribed for the treatment of syphilis.²⁵ There would seem to be considerable justification for the recent suggestion of Eagle and Musselman²⁴ that it would be desirable to assay the potency of penicillin preparations, not as is done now by *in vitro* tests on a standard strain of staphylococcus, but by *in vivo* tests on specific infections in living animals. This would avoid the occurrence of difficulties such as those which have arisen because of the changing K content of commercial penicillin.

Again, although penicillin may be able to control the growth of an infective agent, it has no effect whatever upon the bacterial toxins which such an organism may have produced. The administration of the antibiotic in no way diminishes the need for the administration of adequate amounts of antitoxin in such conditions as diphtheria, tetanus or gas gangrene infections, nor does it relieve the physician of the responsibility of using any other appropriate treatment.

Administration and dosage.—The object of penicillin therapy is to expose the infecting organism, wherever it may be, to a concentration of the antibiotic sufficiently high to inhibit its growth, and to keep this up long enough to allow the natural defences of the body to deal with these devitalized bacteria. This may be accomplished by the local applications of penicillin solutions, creams, or powders to superficial lesions of the skin; by the use of pastilles, sprays, and nebulized solutions in the mouth, throat, and respiratory passages; by the irrigation of the depths of a wound with penicillin solutions; by the direct injection of penicillin into infected joints, abscesses, or empyema cavities, or into the intrathecal space by lumbar, cisternal or ventricular punctures. When dealing with a generalized infection such as a septicæmia or syphilis, with a deep-seated condition such as a pneumonia, or with an extensive tissue infection such as a widespread cellulitis, the

only effective method of administering penicillin is by intravenous or intramuscular injections.

Penicillin when given parenterally in watery solution is rapidly distributed throughout the body, reaching a maximum concentration in the blood—the level of which depends upon the size of the dose administered—almost immediately after a single intravenous injection and within fifteen to twenty minutes after an intramuscular injection.²¹ Although reaching all the ordinary tissues it does not pass readily into the thecal, pleural or articular spaces, and when dealing with infection in these sites local injection is necessary. The material is rapidly eliminated, largely through the kidneys, so that two hours after the administration of a single dose only traces remain in the blood, and three hours after injection it may not be possible to demonstrate its presence at all. This rapid absorption and elimination requires that, in order to establish and to maintain a satisfactory blood level by the use of watery solutions, penicillin must be administered no less often than once every three hours night and day, or must be given by continuous drip infusion.

Numerous attempts have been made to slow down the rate of absorption or to decrease the rate of elimination in an effort to decrease the number of injections necessary to maintain a satisfactory blood level.^{26 to 29} Probably the only practical method has been proposed by Romansky and Rittman,^{30, 31, 32} who have shown that when 150,000 units of penicillin are injected intramuscularly in 1.5 c.c. of a beeswax-peanut oil mixture a satisfactory penicillin level for dealing with normally sensitive organisms is maintained in the blood up to ten hours after injection. This has been confirmed by others including Nichols and Haunz³³ who found measurable levels of penicillin for as long as thirty hours after a single injection of 300,000 units in 1 c.c. of such a mixture. This is a very useful method for the administration of penicillin, particularly in cases of gonorrhœa where such a technique makes it possible to treat a patient with but one single intramuscular injection.

Attempts have also been made to use the oral route for the administration of penicillin. Only a very small portion of such swallowed penicillin is absorbed because most of it is destroyed in the gastro-intestinal tract. However, when amounts four to five times as large as

the usual intramuscular doses are given by mouth, it is frequently possible to demonstrate therapeutic levels in the blood stream.^{34, 35} Attempts to increase the degree of absorption by the simultaneous administration of various antacids to neutralize the gastric acidity have given conflicting results. The lack of certainty of absorption and the large amount of penicillin necessary to produce adequate blood levels has prevented this form of therapy from being extensively used.

Clinical uses.—It obviously will be impossible to deal here in detail with the dosage schemes recommended for the treatment of all the infectious diseases which respond to penicillin therapy, but a few general remarks may be made in this connection.

(a) *Septicæmia due to staphylococci, streptococci, pneumococci and other sensitive organisms.*—Such septicæmias are usually associated with some other pathological process such as an extensive cellulitis, carbuncles, abscesses, septic abortions, mastoiditis, osteomyelitis, and so on. Prior to the introduction of sulfonamide therapy the mortality in such patients was high as 90%. With sulfonamide therapy nearly 60% have recovered, and since the introduction of penicillin treatment the recovery rate has jumped to 75% or more.³ This represents a remarkable improvement and is striking testimony to the efficacy of antibiotic therapy in such cases. Patients with such conditions should be treated by the intermittent or continuous intramuscular injection of 15,000 to 40,000 units of penicillin every three hours day and night. The duration of this therapy will be determined by the severity of the condition and the promptness with which it responds to treatment. It should be continued for several days after the temperature has subsided to normal and all signs of infection have disappeared. Such therapy must be accompanied by any surgical measures necessary to drain collections of pus or to deal with any other focus of infection.

(b) *Subacute bacterial endocarditis.*—The present status of antibiotic therapy in the treatment of this hitherto almost certainly fatal disease has been covered recently in detail by Rykert³⁶ and there is no need here to say more than that a proportion of these cases can be cured by penicillin when given in adequate dosage and over a sufficiently long period of time. Rykert

advocates the use of 200,000 units daily by intermittent or continuous intramuscular injection when dealing with an organism of ordinary sensitivity. If fever persists and blood cultures remain positive, then the size of the dose should be increased to 500,000 units daily. The therapy should be continued for at least twenty-eight days, and longer if the condition is of long-standing.

(c) *Pulmonary conditions.*—The pneumococcal and other pyogenic pneumonias respond well to penicillin therapy given in the regular routine dosage. Empyemas due to sensitive organisms should be treated by systemic administration of penicillin along with intrapleural injections of 25,000 to 50,000 units daily, repeated aspirations and, if necessary, by surgical drainage. Farquharson and his colleagues³⁷ report excellent results in patients with acute lung abscesses. Olsen³⁸ has advocated the use of nebulized penicillin in cases of bronchiectasis where the organisms are penicillin sensitive. In a limited series of such patients, Dr. Pugsley of the Toronto General Hospital³⁹ has not succeeded in obtaining the striking decrease in the amount of sputum noted by Olsen to result from this form of treatment.

(d) *Meningitis.*—Although the meningococcus is very sensitive to the action of penicillin, the fact that the systemic administration of the antibiotic gives negligible penicillin levels in the spinal fluid makes adequate sulfonamide therapy still the method of choice.

In pneumococcal, staphylococcal, and streptococcal meningitis, penicillin therapy has caused a marked improvement in the prognosis. The treatment should combine systemic administration of penicillin in dosage similar to that outlined above with adequate systemic sulfadiazine therapy and, in addition, intrathecal administration by the lumbar route of doses of 10,000 to 20,000 units of penicillin daily. A difficulty that may be encountered is the development of a spinal block which may require that the penicillin be given by cisternal or even ventricular puncture as advocated by Cairns *et al.*⁴⁰

(e) *Prophylactic use of penicillin.*—The value of penicillin treatment in preventing rapid growth and spread of wound infections was well established during the last Great War.⁴¹ It in no way does away with adequate surgical débridement nor does its use relieve the physician of the necessity of administering tetanus

antitoxin and, when necessary, polyvalent gas gangrene antitoxin. It does, however, by controlling pyogenic infection, often make it possible to perform a successful early secondary suture, thus saving many weeks of hospitalization and achieving results far superior from the æsthetic and functional points of view to those formerly obtained. A practical scheme of dosage, which should be continued for four to five days after closure of the wound, in these cases is 15,000 to 20,000 units of penicillin given by intermittent intramuscular injection every three hours night and day.

The prophylactic use of penicillin is recommended when any surgical procedure, such as lobectomy for bronchiectasis, likely to be followed by serious postoperative infection is to be undertaken.⁴² Its use is advocated when dental extraction is to be done on patients with rheumatic heart disease in an attempt to minimize the risk of developing a subacute bacterial endocarditis.⁴³ The administration of penicillin has also been shown to be effective treatment in preventing or controlling infections as the result of agranulocytosis.^{44, 45, 46}

(f) *Gas gangrene and tetanus.*—Although penicillin administration to cases of gas gangrene in no way replaces adequate surgery and treatment with antitoxin, it is nevertheless, a worthwhile addition to the treatment of this very serious condition.⁴⁷ Reports on the use of penicillin in the treatment of cases of tetanus are few and conflicting.^{48, 49} It should probably be administered in standard dosage but it should not be allowed to interfere with the giving of full doses of antitoxin and other necessary measures.

(g) *Gonorrhœa.*—Penicillin is highly effective in the treatment of acute gonorrhœa. This applies as well to the fresh case as to the one which has been found to be sulfonamide resistant. The administration of six doses of 15,000 to 20,000 units each over a period of fifteen hours has resulted in 95% of cures,³⁷ and many of the failures respond to a second similar course. Because such treatment may mask, but not eradicate, a simultaneous luetic infection, it is highly desirable that patients treated in this way should have serological tests for syphilis done at three-month intervals over the course of the next year.

(h) *Syphilis.*—The penicillin treatment of syphilis has not yet been accurately assessed and it may be said to be still in the experi-

mental stage. A great deal of data has been accumulated using different schemes of dosage of penicillin alone and penicillin combined with mapharsen or bismuth, or both,^{25, 50} There is no doubt that the treatment of sero-negative primary lesions with one of the accepted routines results in a high proportion of cures, but the percentage of relapses increases considerably when treatment is begun during the later stages of the disease. The advocated treatment varies from 60 injections of 20,000 units every three hours given over a period of eight days—total dose 1,200,000 units—to amounts four and one-half times as high. The administration of 60 doses of 40,000 units each every three hours—total dose 2,400,000 units—is advocated for the treatment of syphilis in pregnancy⁵¹ and the prevention of prenatal syphilis in the infant.⁵² Congenital syphilis has also been shown to benefit by treatment with penicillin.⁵³ The results of penicillin treatment of neurosyphilis are more difficult to assess. Certainly the evidence would not seem to justify using it to the exclusion of the other standard methods of treatment.

(i) *Other diseases.*—There is evidence that penicillin therapy is helpful in the treatment of Weil's disease but it is not very convincing.⁵⁴ Given in the form of slowly dissolving pastilles of 1,000 units each, penicillin is an effective treatment for Vincent's infection in the mouth, and may have some value in the treatment of acute streptococcal pharyngitis. Systemic penicillin may be useful in the treatment of those cases of diphtheria in which there is considerable surrounding cellulitis but antitoxin must also always be given in full dosage. Penicillin is also used in many ways in the specialties but there is no time to discuss these here.

Toxic reactions.—The administration of penicillin is never attended by any reactions as serious or disturbing as the agranulocytoses or the anurias that may result from sulfonamide therapy. It causes no disturbance whatever in liver or kidney nor does it interfere in any way with the function of the bone marrow. However, it does give rise to a number of reactions which, although not dangerous, may be very annoying. The degree of purification of the penicillin now being produced has largely done away with the febrile reactions, chills and local pain which were commonly associated with the early products. The most frequent reactions encountered

now are probably allergic in origin and resemble those seen in serum sickness. Such reactions may come on almost immediately but they usually make their appearance seven to fourteen days from the onset of therapy and they occur in about 5 to 7% of cases. They are characterized by generalized urticaria and itching and occasionally by myalgia, arthralgia and areas of angioneurotic oedema. These symptoms usually subside within four to five days and are rarely severe enough to make it necessary to stop the penicillin if the condition of the patient requires that it be continued. They can be controlled, in part at least, by the use of adrenalin or ephedrine and still more effectively by the new drug, benadryl. Similar reactions have been reported as having been produced by crystalline penicillin so that it is not certain whether these reactions are due to the antibiotic itself or to the presence of impurities. Other reactions such as vesicular and bullous dermatitis, severe asthma, and abdominal cramps with diarrhoea, have been reported from time to time but these are comparatively rare.

STREPTOMYCIN

As penicillin acts only on Gram-positive organisms (with the exception of the gonococcus and meningococcus) an intensive search has been made for an antibiotic that would be antagonistic in a similar way to Gram-negative bacteria. Two such substances—streptothricin and streptomycin—have been prepared by Waksman^{55, 56} from cultures of certain actinomycetes. Of the two, streptomycin, having the wider range of activity and certain other advantages, is the one that has been chosen for production in commercial quantities. Numerous observations on its clinical use have been reported^{57 to 62} and although it is not yet on the market it is likely that it will soon be available for general use.

Selective action.—Streptomycin exerts, as do the other antibiotics, its action only upon certain bacteria. In Table II a list of the organisms resistant to the action of penicillin is given, and it so happens that these penicillin resistant organisms are, by and large, sensitive to the inhibiting action of streptomycin. These include the Gram-negative bacilli, *Streptococcus faecalis*, and the tubercle bacillus. Again, as is the case with penicillin, the fact that a certain organism

is sensitive to the action of streptomycin in the test tube is no guarantee that it will be adequately dealt with when growing in the living patient. This is exemplified in the case of undulant fever and in other conditions where the administration of large quantities of streptomycin apparently does not affect the course of the disease in any way.⁶⁰ There is a wide range in the sensitivity of the susceptible organisms, *B. aerogenes* being very sensitive whereas most strains of *B. pyocyaneus* are very resistant. It would appear that sensitive organisms acquire a resistance to the action of streptomycin more readily than they do to penicillin.⁶¹

Administration and dosage.—Streptomycin may be administered to patients by any of the methods described above for penicillin. For systemic therapy it is usually given intramuscularly or intravenously in doses of 125 mgm. (125,000 units) or more in 1 to 2 c.c. saline solution every three hours day and night. It is not absorbed at all when given by mouth nor does it penetrate the thecal or pleural spaces in appreciable amounts when given parenterally.

Clinical use.—Streptomycin will probably be of value in the treatment of bacteræmias caused by any of the sensitive organisms. In such cases it should be administered in doses of 125,000 to 250,000 units every three hours (1 to 2 grams daily). It has been shown to be very effective in the treatment of tularæmia, but it is of doubtful value in the treatment of undulant and typhoid fever.⁶⁰

It has also been shown to be effective in the treatment of many urinary tract infections, particularly those caused by *B. aerogenes* and *B. proteus*.⁶⁰ The results are not always so satisfactory when the infecting organism is *B. coli* or *B. pyocyaneus*. The dose here should be 1,000,000 to 2,000,000 units daily and care should be taken to make sure that the urine is mildly alkaline and not acid in reaction. Good results have also been reported in Friedländer's pneumonia, in bronchiectasis associated with the presence of Gram-negative organisms⁶³ and in meningitis caused by *B. influenzae*.⁶⁰ Considerable work has been done concerning its use in experimental and clinical tuberculosis⁶⁴ and, although it seems to have been effective when given by systemic and aerosol therapy in a few cases of tuberculous laryngitis⁶⁵ and tracheo-bronchial tuberculosis,⁶⁴ it has been of question-

able value in the treatment of other varieties of tuberculosis even when carried on for long periods of time.

Toxic reactions.—Streptomycin administration may at times give rise to a histamine-like reaction with flushing of the skin, probably due to the presence of impurities. Toxic erythemas and urticarial rashes are encountered and, in some cases, headache, nausea and vomiting. Prolonged administration of large amounts may give rise to temporary eighth nerve involvement with tinnitus and vertigo and occasional deafness.

SUMMARY

1. Antibiotics are therapeutic agents, recently developed to a practical degree, which have been found to be remarkably effective in the treatment of certain infectious diseases.

2. They exert their action only upon certain specific organisms and it is therefore necessary that the nature of these organisms be known if the therapy is to be successful.

3. They must be employed in such a way that the offending bacteria are exposed to their action in a sufficiently high concentration and over a sufficiently long period of time.

4. They act by killing and inhibiting the growth of sensitive bacteria but they have no effect whatever on any toxins that such bacteria may have already produced.

5. The development of antibiotics has introduced a very important new principle into the realm of practical therapeutics, a principle that will undoubtedly result in the discovery of other similar substances even more powerful and useful than those which are now available.

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RÉSUMÉ

Les antibiotiques sont des agents thérapeutiques de découverte; ils agissent de façon remarquable dans certaines infections. Cette action, toutefois, ne se manifeste que vis-à-vis de certains organismes spécifiques. Il faut, par conséquent, bien connaître ces organismes avant de décider l'emploi de ces médicaments. Lorsque la décision sera prise, il s'agira d'administrer l'antibiotique à des concentrations suffisantes et pendant un temps suffisamment prolongé. Le principe sur lequel s'appuie l'usage des antibiotiques permettra de nouvelles découvertes et probablement la mise en œuvre de produits beaucoup plus puissants.

JEAN SAUCIER

LARYNGO-TRACHEO-BRONCHITIS*

(A statistical review of 549 cases)

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THE disease which in the last decade has been termed, almost universally, laryngo-tracheo-bronchitis is one which is rarely seen in adult life. There are several sound reasons for this well-attested fact; the infant's larynx is peculiarly susceptible to reflex spasm, its structure is much less rigid and therefore more easily collapsed, and inflammatory oedema of the mucous membrane is much greater in relation to the diameter of the lumen than in the adult larynx and the airway is encroached upon to a greater degree. It is, however, not easy to explain the greater incidence of simple laryngitis in childhood except on the basis of a lower degree of immunity to respiratory infections in early life.

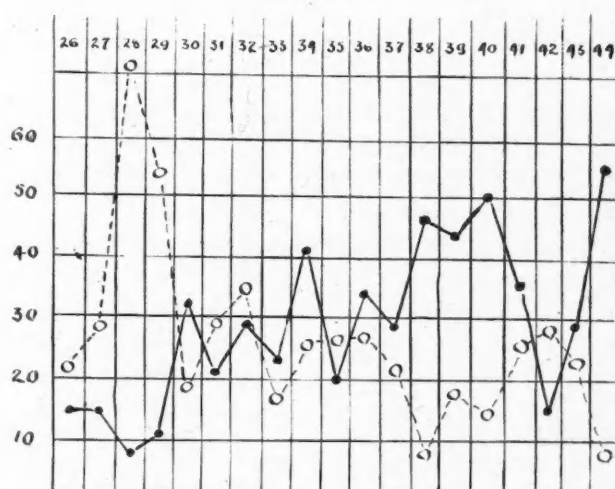
The term laryngo-tracheo-bronchitis, now generally adopted, is at best a diagnosis of convenience to describe a group of cases presenting the same initial clinical picture, but it is often inaccurate when applied to any individual case in the group. Actually only 12% of the authors' series were proved by laryngoscopic examination, autopsy or at operation, to have any involvement of the trachea or bronchi.

An analysis of 549 cases admitted to the Hospital for Sick Children from 1926 to 1944

inclusive was undertaken with the hope that the data procured might throw some light on the etiology, and by noting past errors in diagnosis and medical and surgical treatment standardize the future management of this distressing condition. The series does not include any case of laryngeal diphtheria but does include cases of spasmodic croup whose condition was serious enough to require hospitalization.

In the last 19 years, 549 cases were admitted. Chart 1 shows in graphic form the number of admissions each year (solid line), and the mortality percentage (broken line).

CHART 1



There has been a steady increase in the yearly admissions from an average of 12 in the first four years to a peak of 55 in the last year. This cannot be explained by a corresponding increase in total medical admissions since these have increased only 50% in the same period. It is probable that the potential seriousness of the disease is now more generally recognized by the profession.

As has been pointed out by other observers, the mortality rate is usually in inverse proportion to the total number of cases in any given year. For example, in 1928 only 8 cases were admitted and 75% died, whereas in 1938, '39 and '40 when 46, 44 and 50 cases respectively were admitted, the mortality rate was only 8.7, 18 and 14% and in the peak year of 1944 there were 55 cases with a mortality rate of only 9.2%.

The sex incidence was similar to that in pneumonia, e.g., 65% males and 35% females.

Age incidence.—In the series 69% were under 2 years of age and only 5% were over 6 years. These figures assume more importance when

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estimating the prognosis. As will be shown later, the highest death rate is in the first few years of life.

Seasonal incidence.—This is essentially the same as for the common respiratory infections. Over 70% occur in the 6 months' period from November to April inclusive, the peak months being February and March.

BACTERIOLOGY

There seems to be no unanimity of opinion among recent observers as to the identity of the organism most commonly found by culture in this disease. Davies² from cultures taken ante-mortem reports the relative frequency as *S. hæmolyticus*, *Staph. aureus* and pneumococcus but in post-mortem cultures there was a marked preponderance of *Staph. aureus*; in fact all his fatal cases with one exception were due to this organism. McCready³ and Sinclair⁴ consider *B. influenzae* the most important causative agent. Walsh⁵ and Matthew⁶ found *Staph. aureus* in most of their cases but Jackson⁷ reports 85% of their cases infected by *S. hæmolyticus*. Neffson⁸ found the relative frequency to *S. hæmolyticus*, *S. viridans*, and *Staph. aureus*, the latter being relatively uncommon. In the more recent articles the possibility of virus infection is discussed.^{3, 9, 10, 11}

The diversity of findings is, no doubt, due to the fact that different organisms predominate in certain epidemics and in certain years. There is, too, a great variation in the methods of obtaining material for culture. Organisms recovered from a simple throat swab are often quite different from those grown from the site of the disease, during operation or at autopsy. In this study most of the bacteriological findings from 1926 to 1939 have been omitted for two reasons; the method of obtaining the material was by simple throat swab and the search was primarily to establish the presence or absence of Klebs-Loeffler bacillus. However, the cultures taken during this period during operation or at autopsy are recorded because of their greater accuracy. Commencing in 1940, all material was collected by the method described by Auger.¹² The organisms recovered by this method are, in a high proportion of cases, identical with those isolated at operation and give one a reliable picture of the bacterial flora at the site of the disease. During January and February, 1945, there was a sharp increase in

the number of cases admitted—55 in all—and although these have not been included in the general clinical survey they have been included in the bacteriological records.

CHART 2

	Alone	Mortal- ity %	In combination	Mortal- ity %
Strept. H.....	53	28	34	30
Staph. Aur.....	34	44	38	40
Pneumoc.....	29	27	18	17
Strept. Vir.....	13	15	9	44
B. Influen.....	2	100	5	0
Mixture of organisms.....	77	..	..	..
No growth.....	20	..	..	..

Chart 2 shows the relative frequency of the organisms isolated from 1940 to 1945 inclusive. The material was obtained by Auger suction or by culture directly from the site of the disease at operation or post mortem.

CHART 3

	Alone	Mortal- ity %	In combination	Mortal- ity %
Strept. H.....	28	50	18	50
Staph. Aur.....	26	58	24	50
Pneumococce....	9	66	2	50
Strept. Vir.....	10	20	8	50
B. Influen.....	1	100	..	..
Mixture of organisms.....	14	0	..	..
No growth.....	13	0	..	..

Chart 3 shows the frequency of organisms recovered in the entire series by direct cultures from the site of the disease at operation or post-mortem and gives a slightly more accurate picture of the bacteriology than Chart 2. The relative frequency of the bacteria isolated is the same in both charts but the mortality figures for *Staph. aureus* and pneumococcus infections are higher in Chart 3. The number of instances where "no growth" or "a mixture of organisms" was recorded is of particular interest since it suggests virus infection. Although the mortality percentage of cases with combined infections was not as high as those with pure cultures, one combination viz. *S. hæmolyticus* and *Staph. aureus* proved to be a serious one with a death rate of 60%.

As suggested before, the frequency of various organisms varied from year to year. In 1940 to 1941 *S. hæmolyticus* predominated; in 1943 *Staph. aureus*, in 1944 pneumococcus and during January and February, 1945, epidemic nearly all the cultures were reported as mixed infection

or no growth. The belief that many of these cases are the result of virus infection is not based on mere speculation. Several facts tend to confirm it: (1) A specific virus of laryngo-tracheo-bronchitis has been identified by two Australian workers¹³ who used it in their experiments on chick embryos. (2) The frequency with which no common bacterial agent is recoverable by culture from the site of the disease. (3) The failure of penicillin or the sulfonamides to affect the course of the disease in the spectacular manner that is customary in those conditions ordinarily produced by pathogenic bacteria. (4) The postoperative convalescence in suspected virus cases is notably free from those difficulties which usually attend the cases due to bacterial infection. (5) The leucocyte count in suspected virus infections is frequently low. In 66 cases where "no growth" or "mixed growth" was reported 76% had leucocyte counts of less than 10,000 per c.mm. whereas in 87 cases in which a pure culture of either *S. hæmolyticus*, *Staph. aureus* or pneumococcus was reported, 66% had a leucocytosis of over 10,000.

There is considerable evidence to support the view that some of the cases are primarily infected by a virus with a secondary bacterial invasion several days later. A negative culture on admission and a positive culture of one of the common bacteria at the time of operation or post-mortem is a sequence of events which is suggestive.

From a bacteriological point of view it would seem logical to classify the cases into three main groups: (1) Virus infections. (2) Bacterial infections. (3) Primary virus with secondary bacterial infection.

The last group was more readily identified before the advent of sulfonamide therapy. The exhibition of this drug has to a great extent prevented a secondary invasion.

PATHOLOGY

The various types of pathological change observed in these cases are:

1. Simple catarrhal inflammation of the laryngeal mucosa, typical of the mild infections and of so-called spasmodic croup.

2. Inflammatory oedema of the laryngeal mucosa with or without muco-purulent exudate. This type of lesion is much the most common, being found in 66% of those cases

where the site of the disease was actually visualized.

3. Inflammation of the mucous membrane of the trachea and bronchi encountered in only 36%.

4. Denudation of the mucous membrane with formation of a gummy exudate. Such cases are included in the 36% mentioned above.

5. Inflammation with formation of a pseudo-membrane in the trachea. Contrary to the common belief this type of pathological change was infrequently seen, being recorded in only 16 cases, or 9% of the 181 cases where the site of the disease was visualized, and only 3% of the whole series.

Sections of tracheæ were examined microscopically in an endeavour to correlate the histological picture with a known pathogen—either virus or micro-organism. The result of this study was inconclusive. There seemed to be no uniformity in the type of inflammation produced by each organism but certain trends were apparent. Denudation of the mucosa was fairly characteristic of *Staph. aureus* infections, less so of *S. hæmolyticus* infections and rarely seen in suspected virus infections.

The relative frequency of bacteria producing a pseudo-membrane was *Staph. aureus*—3 cases; *Staph. aureus* and *S. hæmolyticus* combined 4 cases; *S. hæmolyticus* 2 cases and one each of pneumococcus and *s. viridans*. In five instances where a pseudo-membrane was found, no cultures were taken. These figures conflict with Orton's¹⁴ who found *S. hæmolyticus* to be the most common cause of pseudo-membrane.

CLINICAL PICTURE

The characteristic syndrome has been described by many writers, and the cases differ one from another only in the degree of severity. The onset, preceded as a rule by an upper respiratory infection, is sudden in about 75% of the cases, with a brassy cough and pyrexia of varying degree. The symptoms persist in spite of the usual palliative treatment and this fact tends to distinguish it from simple spasmodic croup. Recession of the soft parts is seen early but, contrary to the usual belief, is not always an indication of obstruction due to inflammatory oedema, since it is commonly seen in spasmodic croup. As the disease progresses indrawing becomes more marked and it then assumes more serious significance. There is a definite rela-

tionship, as pointed out by numerous observers^{15, 16} between the degree of recession and the situation of the obstruction; the greater the indrawing the higher up in the respiratory tract is the obstruction.

The course of the disease is unpredictable, many recover spontaneously in a few days, others progress until they present an alarming picture of respiratory obstruction, extreme restlessness, air-hunger, greyish cyanosis, rapid pulse, shallow respirations and hyperpyrexia, in other words anoxia and circulatory failure. The cause of the hyperpyrexia is not easy to assess. A temperature of 106° or more was recorded in 42 cases or 7.6% of the series, and was of very serious significance. These high temperatures are usually attributed to overwhelming toxæmia but there is no doubt that anoxia is to some extent responsible.

DIFFERENTIAL DIAGNOSIS

The only condition closely resembling L.T.B. is laryngeal diphtheria. This disease has almost disappeared in this locality. All children who have not received toxoid should be viewed with suspicion and given diphtheria antitoxin. Throat smears, cultures and laryngoscopic examination should leave little room for doubt. Inhalation of a foreign body is excluded by the history of onset, fluoroscopic and x-ray examination of the chest and by auscultation. A few cases of L.T.B. with "low-down" obstruction may simulate broncho-pneumonia. Such a one was admitted recently in a moribund condition. There was no history of croupy cough, cyanosis was extreme, and there was no indrawing. At autopsy the larynx was found to be moderately inflamed but below this point the lumen of the trachea and bronchi was occluded with a thick jelly-like material. Death was due to pulmonary collapse and anoxia.

TREATMENT

This will be discussed under two main headings:

A. Prophylactic.—With the advent of antibiotic drugs into the world of therapeutics it was felt that the answer to the prevention of this disease had been achieved. It was hoped that administration of one of these drugs to every case of simple croup would check the development of serious manifestations. Although the procedure has undoubtedly saved

many lives it has not been uniformly successful. Many cases develop so rapidly that the drug is not given a chance to control the infection; also many of the cases are the result of virus infection which is not affected by antibiotic drugs. The procedure is, however, of great value in the primary bacterial infections and also is an important factor in the reduction of mortality by limiting secondary bacterial invasion in the virus cases and by preventing serious postoperative complications such as mediastinitis and broncho-pneumonia.

B. Remedial.—Every case of laryngitis admitted to the Hospital for Sick Children is given so-called expectant treatment. The object of this treatment is to assess the rôle played by spasm or inflammatory œdema in the production of symptoms. Expectant treatment consists of: (1) placing the child in an atmosphere saturated with moisture. The steam tent is the appliance commonly used but it has certain disadvantages. The heat is oppressive and enervating and also tends to increase inflammatory œdema. Cool moist air as advised by Davidson¹⁷ is preferable but owing to the scarcity of electrical humidifiers during the war period this has been difficult to achieve. (2) Administration of sulfadiazine in doses ranging from 1¼ to 4 grains per lb. body weight depending on the severity of the symptoms; or penicillin 100,000 O.U. to 200,000 O.U. per day, or a combination of the two antibiotics. (3) Sedation with one of the barbiturates, preferably nembutal because of its more rapid action. Derivatives of opium are contraindicated since they tend to dry up secretions. (4) Culture of the sputum by Auger suction. (5) A leucocyte count. (6) Removal of mucous plugs from the lower pharynx by gentle suction through a nasal catheter.

The administration of hypertonic human plasma as described by Baum¹⁸ has not, in our experience, proved of value. Oxygen is of help in combating cyanosis but must be used sparingly since it reduces secretions from the mucous membranes. If no amelioration of the symptoms occurs in one hour it is logical to assume that the obstruction of the air-way is due to causes other than muscle spasm. Operative interference now becomes a possibility. It is at this point that the services of the oto-laryngologist are required. His responsibility is that of determining the site of the obstruction, the

nature of the obstruction, the necessity for operative intervention and the type of operative procedure which offers the greatest hope of success.

INDICATIONS FOR OPERATION

A. Medical.—(1) Failure to respond to expectant treatment. (2) Increase in the degree of retraction of the soft parts. (3) Extreme restlessness and air-hunger. (4) Cyanosis. (5) Diminished air entry into one or both lungs. (6) Rapid thready pulse. (7) Fatigue.

B. Surgical.—The demonstration by gentle quick laryngoscopy of the presence of muco-pus, inflammatory oedema or membrane in the larynx, trachea or bronchi. If these pathological changes are slight, delay in operation may be decided upon but the patient must be watched by a resident specially trained for this task; if, however, they are severe, operative interference is advised and the choice must be made of three procedures: intubation, bronchoscopic suction and tracheotomy.

Intubation.—This procedure is impracticable in supra-glottic oedema and useless in low-down obstructions. If the obstruction is entirely in the larynx intubation may suffice. It affords at least temporary relief until a tracheotomy can be performed, and in a number of cases of simple laryngitis in our series intubation alone was followed by recovery. The intubated patient however requires unremitting attention. Prolonged intubation is contraindicated since it tends to increase inflammatory oedema and may cause ulceration and subsequent stenosis.

Bronchoscopic suction.—This is the method usually employed in those cases where laryngoscopy has revealed an adequate air-way in the larynx, but obstruction in the trachea or bronchi by muco-pus, pseudo-membrane or gummy exudate. It is our impression, however, that even in these cases a tracheotomy is to be preferred. Suction through the tracheotomy opening with a soft catheter can remove much of the semi-fluid exudate and bronchoscopic suction can still be performed if necessary, to remove thick plugs. A foreign body forceps is often required.

Tracheotomy.—If the severe air hunger has not been decisively relieved by the measures described above, tracheotomy should be performed forthwith. This may appear too drastic but it is the lesson taught by our long experi-

ence. Tracheotomy is not an operation to be feared. With proper precautions and technique the mortality from tracheotomy alone should be nil.

Tracheotomy is commenced by laryngoscopy and the immediate passage of an intratracheal catheter or relatively small bronchoscope. If, when the tube has been inserted, the patient's breathing is not relieved there is obstruction lower down; if an intratracheal catheter has been used it is pulled out and a bronchoscope at once inserted through which suction or forceps is used; if a bronchoscope has been passed a suction tube or forceps is passed through it and used until an airway has been achieved. Adrenaline or tuamine in isotonic saline may be found useful.

When the patient is moribund no anaesthetic is necessary. When the patient is able to struggle light anaesthesia administered through the intratracheal catheter or bronchoscope diminishes the dangers.

The tracheotomy is performed in the standard manner with a midline incision, but the bronchoscope or intratracheal catheter must be held exactly in the midline or the surgeon may cut through some muscles. This is especially important when the patient is an infant. To avoid future plugging use the largest possible tracheotomy tube. The blood vessels and isthmus ends are tied but the wound is left open.

A split pad of flat gauze, especially sewn as described by Jackson so that no ravellings can get down into the trachea, is slipped about the tracheotomy tube which is then covered with a moistened fluffy piece of gauze.

We agree with Jackson that a good procedure in dealing with an asphyxiated patient is to insert a bronchoscope and establish regular respiration through it and then perform a low tracheotomy in an ordinary manner. We are not in agreement with McCready³ that the bronchoscope used to facilitate tracheotomy causes pneumothorax. With experience in the technique of passing a bronchoscope, there is no need to do damage. This procedure has been followed many times in the hospital and in none of the patients who died from pneumothorax or mediastinal emphysema did autopsy show damage to the trachea from the bronchoscope.

In our opinion the intratracheal catheter has certain advantages over the bronchoscope. It is pliable. It is as readily passed as the bronchoscope and it can be held in position by a relatively inexperienced person while the tracheotomy is carried on. The size of the tube that is used, whether rigid or pliable, is of importance. It should be small enough to be passed without difficulty. It should never be so big that the larynx closes in spasm around it.

Instead of the bronchoscope causing pneumothorax its insertion should minimize the danger of pneumothorax and mediastinal emphysema; it very quickly eliminates the high intra-pulmonary pressure which de-

velops with severe laryngeal obstruction. In patients that are toxic or semi-moribund the passage of either of these tubes allows the tracheotomy to be carried on without anaesthesia of any kind. In other patients the anaesthesia may be local or general. With anaesthesia carried on by an experienced anaesthetist there is no danger, no damage, and tracheotomy is made very much easier.

Post-operative treatment.—Tracheotomy is not the end or the most difficult part of the surgeon's task. Alone, it will not cure cases of tracheitis or acute septic tracheo-bronchitis. It is the after-treatment which counts. The outstanding feature of the disease is, as Orton¹⁴ has said, the peripheral asphyxia; the plugging of the trachea and bronchi with heavy thick secretions which rapidly dry into encrusted flakes. The typical gummy plugs are undoubtedly due to secretions from exposed mucous glands following complete denudation of the mucosa as the result, in the majority of cases, of bacterial infection rather than virus. These plugs have been found during bronchoscopic examination before tracheotomy has been performed.

The ward treatment in brief, includes the following requirements: (1) Constant attendance of a nurse especially trained in the after care of this type of illness. (2) Availability of a surgeon or resident with apparatus for bronchoscopy and suction constantly in readiness. We have found of great value the Jackson-Tucker bendable aspirating tube. This instrument, with a little practice, can be passed through the tracheotomy opening and into either main bronchus without producing trauma. (3) Adequate humidity. (4) Suitable temperature. (5) Adequate rest for the patient.

CAUSES OF DEATH

The most frequent cause of death is anoxia with cardiac failure due to suffocation. The reasons for failure to relieve obstructions are manifold: (a) No operative interference is attempted. (b) The choice of operation may be unfortunate, e.g., intubation for a low-down obstruction. (c) Operation is delayed until too late. (d) Sudden aspiration of thick plugs may cause death before a bronchoscope can be passed. (e) The child may be in a moribund state on admission. (f) The accumulation of mucus or pseudo-membrane may be so extensive that any operative interference is unsuccessful.

The second most frequent cause of death is postoperative or preoperative infection outside

the larger air passages. Broncho-pneumonia, mediastinitis and septicæmia are the most common, occurring 16 times in the 106 deaths in this series. In the last six years such complications are becoming less frequent due to the action of antibiotic drugs, and this fact has removed much of the dread which formerly attended the operation of tracheotomy.

The third important cause of death is what appears to be an overwhelming toxæmia. This was a fairly common cause of death in the early years but has been noted only three times in the last five years.

A few writers, notably Neffson,¹⁹ McCready,³ Simpson,²⁰ Richards,¹⁶ Johnson²¹ and Michels,²² have stressed the danger of pneumothorax as a complication of L.T.B. but it is surprising that many observers fail to even mention it. The mechanism of production of this type of pneumothorax has been ably discussed in papers by Iglauer,²³ Macklin²⁴ and Neffson.¹⁹ A rare eventuality but one that must always be kept in mind by the surgeon and physician is the occurrence of pneumothorax before operative procedure is attempted. Examination by fluoroscope and x-ray before operation should be made a routine procedure.

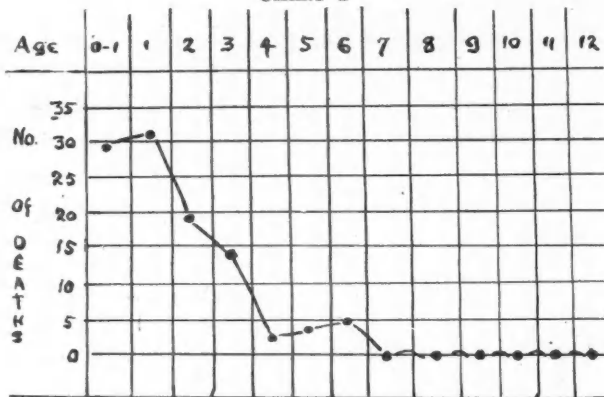
We can not agree with the statement made by McCready³ that the passage of the bronchoscope is responsible for most pneumothoraces. This series embodies a sufficient number of tracheotomies performed under each of several variations of technique to prove that deaths from pneumothorax are not caused by the bronchoscope or the intra-tracheal catheter or by the suturing of the wound below the tracheotomy cannula.

Instead of the bronchoscope causing pneumothorax its insertion should minimize the danger, it very quickly eliminates abnormal atmospheric pressures which develop with laryngeal obstruction. There were 8 proved cases of pneumothorax in this series. Seven followed tracheotomy. In one, the condition was discovered a few minutes after operation and probably preceded it; in another it was definitely diagnosed before any operative procedure was undertaken.

PROGNOSIS AND MORTALITY

Age.—Chart 4 shows the importance which age assumes in estimating prognosis. It will be seen that 87% of all deaths were in children under 4 years of age.

CHART 4



HYPERPYREXIA

This was, in our experience, of serious prognostic importance. Of 42 cases who had a temperature of 106° or over, 37 died—a mortality rate of almost 90%; of 38 cases with a temperature of between 105 and 106° , 14 or 40% died.

CHART 5

	TOTAL NO. CASES	DIED	MORT. ALTY %	for 5 YRS.	OPER. ACTIVE CASES	DIED	MORT. ALTY %	for 5 YRS.
26	14	3	21		1	1	100	
27	14	4	28		3	3	100	
28	8	6	75	31.6	2	2	100	80
29	11	6	54		5	4	80	
30	32	6	19		4	2	50	
31	21	6	29		3	3	100	
32	29	1	34		5	0	0	
33	23	4	17	18	•	•	•	89
34	41	10	24		3	3	100	
35	20	4	26		•	•	•	
36	33	9	27		2	2	100	
37	28	6	21		7	4	57	
38	46	4	9	17	5	1	20	63
39	44	8	18		10	6	60	
40	50	7	14		3	2	66	
41	36	9	25		8	4	50	
42	15	4	27		4	0	0	
43	29	7	24	15	8	4	50	35
44	55	5	9		7	3	42	
45	41	1	2.5		4	0	0	

Chart 5 depicts the mortality rate for the years 1926 to 1944 inclusive and for the first two months of 1945. Two mortality rates are shown, that for all cases admitted in each year and that for the cases operated upon. The gradual reduction in the death rate is best shown in columns 4 and 8 where the cases have been grouped into five-year periods. The most striking reduction is in the cases operated upon from a high of 80% to a low of 35%. If one

were to eliminate from the statistics of the last 5 years those cases who were moribund on admission or those who died from a sudden aspiration of plugs before bronchoscopy was possible the mortality figures could be even further reduced.

SUMMARY

1. The case records of 549 children admitted to the Hospital for Sick Children from 1926 to 1944 have been analyzed and 41 cases occurring in January and February, 1945 have been included in part of the survey.

2. There has been a steady increase in the number of cases admitted, and the seriousness of the individual cases was in inverse proportion to the number admitted in any year.

3. The sex, age and seasonal incidence have been shown.

4. The relative frequency of bacteria isolated was *S. hæmolyticus*, *Staph. aureus* and pneumococcus. *B. influenza* was infrequently found.

5. There can be no doubt that many of the infections are primarily due to a virus. These are recognized by the lack of response to antibiotic drugs, failure to demonstrate pathogenic bacteria in the cultures, a normal leucocyte count or a leucopenia, and a fairly typical clinical course.

6. Pseudo-membranous inflammation was found most commonly in *Staph. aureus* infections; denudation of the mucosa in *Staph. aureus* and *S. hæmolyticus* infections, seldom in virus infections.

7. Antibiotic drugs are of value in prophylaxis and should be exhibited in every case of simple spasmodic croup. If given early enough they will probably prevent the development of serious manifestations in the bacterial cases, but will have little restraining effect on the virus infections. They will prevent secondary infections and reduce the incidence of serious postoperative complications.

8. Tracheotomy is the operation of choice and should be performed early in the disease, but subsequent bronchoscopic suction must be frequently resorted to if lives are to be saved.

9. Intubation cannot be recommended as an operative procedure except as a temporary expedient to relieve obstruction.

10. The postoperative management is the most precarious phase of the treatment and requires experienced nurses and the constant attendance of a trained bronchoscopist.

11. The principal causes of death are failure to relieve obstruction, overwhelming toxæmia, postoperative infection, pneumothorax and mediastinal emphysema.

12. Eighty-seven per cent of all deaths were in children under 4 years of age.

13. Hyperpyrexia is a serious prognostic sign.

14. The mortality rate has been gradually reduced in the last 20 years.

15. If one can control serious complications by chemotherapy, and severe toxæmia by early diagnosis and treatment, the only serious condition with which one has to contend is mechanical obstruction and this, with ideal facilities can be corrected in a large proportion of cases.

From the wards and laboratories of the Hospital for Sick Children, Toronto, with acknowledgment and thanks to the anæsthetic service and the Department of Pathology for help and criticism.

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RÉSUMÉ

549 cas de laryngo-trachéo-bronchite furent étudiés pour arriver à la présente discussion. Le sexe, l'âge et les rapports chronologiques de la maladie sont notés. Les agents microbiens en cause ont été le *S. hémolytique*, le *Staph. doré* et le *pneumocoque*; Le *B. de l'influenza* fut plus rare. Par ailleurs, il y a de bonnes raisons de croire que fréquemment l'agent causal doit être un virus. La formation de pseudo-membranes fut plus fréquente avec le *Staph. doré*; cependant, on observa la dénudation des muqueuses avec le *Staph. doré* également, mais aussi avec le *S. hémolytique*. Les antibiotiques sont très efficaces comme agents prophylactiques sauf lorsque la maladie est causée par un virus. La trachéotomie et les aspirations bronchiques ont leurs indications précises. L'intubation ne sera qu'une procédure temporaire. Les soins post-opératoires demandent beaucoup de doigté et la collaboration fréquente du bronchoscopiste. Les principales causes de mort relevées ont été l'obstruction, la toxémie, l'infection post-opératoire, le pneumothorax et l'emphysème du médiastin. 87% des décès eurent lieu chez des enfants de moins de 4 ans. L'hyperthermie assombrit le pronostic. Depuis 20 ans le taux de mortalité a graduellement diminué.

JEAN SAUCIER

THE "SHOCK THERAPIES" AT THE ONTARIO HOSPITAL, LONDON

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INTRODUCTION

THE term "shock therapy" became popular in medical parlance following Sakel's report, in 1933, on the value of insulin therapy in the treatment of schizophrenia. His investigations showed that insulin, in doses large enough to produce hypoglycæmic shock and coma, was of considerable value in the treatment of schizophrenic patients. A few years later Meduna reported on the curative action of metrazol in the treatment of manic-depressive psychosis and schizophrenia. Metrazol, administered intravenously, induces an epileptiform convulsion or grand mal, followed by a transitory period of coma and mental confusion. In 1938 electroshock therapy, introduced by Bini and Cerletti, was added to the list of convulsive therapies. Although these two therapies are usually grouped under "convulsive therapy", electroshock is the one more commonly used.

The conservative attitude with which shock therapy has been regarded in the treatment of mental illness during the past few years, has been replaced in some centres by a more aggressive attitude, since the merits and dangers of the therapy have become better understood. Instead of occupying a position far down or last on the therapeutic list, it has, particularly in this hospital, been promoted to a very prominent position. It is the opinion from observations made at this centre, that shock therapy administered daily to the newly admitted patient with acute psychogenic delirium, commonly renders such patient free from the acute symptoms within three or four days. The necessity for prolonged continuous bath treatment, special nurses, gavage, etc., is thus eliminated entirely or to a great extent. This is particularly the case in the manic phase of manic-depressive psychosis, where the patient is often completely freed of all symptoms within a week, compared with months or longer in the preshock era; and in schizophrenic delirium, where the patient is very often relieved of his acute symptoms within a few days, thus rendering him more accessible to psychother-

apy and other forms of treatment. Depressed patients, though constituting less of a nursing problem, are still regarded as acute emergencies because of their self-destructive tendencies, and should, in our opinion, receive intensive shock therapy as soon after admission as possible.

To illustrate the above point of view the hospitalization periods of two cases are compared.

CASE 1

Mrs. R.N., 65 years of age; manic-depressive psychosis (manic).

January 29, 1945, admitted to Ontario Hospital.

March 12, received first electroshock treatment.

April 6, 8th and last electro-convulsion; free of symptoms.

April 13, patient went home, classified as "recovered".

Total number of days in hospital, 74.

Number of days in hospital after institution of electroshock, 32.

CASE 2

Mrs. D.P., 26 years of age; manic-depressive psychosis (manic).

August 27, 1945, admitted to Ontario Hospital.

August 29, convulsive therapy commenced; shock treatment daily for 4 days.

September 10, 6th and last electroshock treatment; free of symptoms.

September 22, patient returned home, classified "recovered".

Total number of days in hospital, 26.

Number of days in hospital after electroshock treatment was instituted, 24.

Case 1 was 42 days in hospital before she received electroshock, during which time she was in an acute manic excitement, uninfluenced by any form of therapy. After having received 8 convulsions, she had recovered clinically. Within 32 days of receiving shock treatment she was well enough to go home. It is probable that if shock therapy had been instituted two days after admission, she would have recovered 40 days sooner than she did. This point is well demonstrated in Case 2, a case of delirious mania, in danger of death from dehydration and exhaustion. Electroshock was instituted within 48 hours, the patient recovered in 12 days and was able to return home 26 days after admission to hospital. It was unnecessary to gavage the patient, prescribe continuous warm baths, or have her under special observation after instituting convulsive therapy, and this has been the rule in the great majority of our early treated cases.

To continue the above mentioned program of early and intensive treatment, and to fully utilize the therapeutic effects of shock therapy, it was decided to have one physician devote his full time to shock therapy with the follow-

ing main objectives: (1) To administer shock treatment to all recent and suitable admissions to hospital as soon as possible. (2) To administer shock treatment at regular intervals to patients with long-standing mental disorders, who constituted a major nursing problem in the hospital. (3) To provide facilities for prophylactic treatment of former patients with a history of more than two periods of hospitalization within a period of 2 years. (4) To provide facilities for shock treatment for patients on home visits, should evidence of relapse of their mental condition be noted.

Such a clinic was commenced at the Ontario Hospital, London, on November 1, 1944, and this report deals with the activities therein from that date until October 31, 1945.

THE SHOCK CLINIC

On admission patients were carefully examined mentally and physically, and laboratory and x-ray reports were usually completed within a week. The patient was then considered at a preliminary staff meeting, and if suitable for shock therapy was transferred to the shock service where his further care and treatment were supervised. The patient, under ordinary circumstances, was supervised on the admission ward and when improvement occurred in his mental condition, he was transferred to the convalescent ward where all supporting therapy was intensified. Should the patient's symptoms render him a major nursing problem, a more suitable ward was selected, and as improvement occurred he was promoted towards the convalescent ward. In the case of acutely delirious patients where death was imminent from exhaustion, dehydration and excitement, etc., shock treatment was instituted within 24 to 48 hours of admission, if no absolute contraindication was discovered on physical examination. These patients were examined as carefully as their mental condition permitted, chests were x-rayed, and if possible spinal x-rays taken, but lack of a spinal x-ray in this type of emergency did not in any way interfere with the administration of shock treatment, if the physical condition was satisfactory. The dramatic manner in which such cases again and again responded to 3 or 4 daily metrazol or electric convulsions definitely indicated the proper course of action to be taken, and that without procrastination. When this

acute delirium subsides, as it very often did within a few days, more complete physical, mental, laboratory and x-ray examinations were completed.

Simultaneously with the administration of shock and other forms of treatment, the anamnesis and other investigations were completed, when the patient was presented at the formal staff meeting. It was interesting to note the difference at staff meeting between the shock treated and non-shock treated patients. Before the present plan of campaign was commenced, patients were usually presented at staff meeting 3 or 4 weeks after admission to hospital, with full manifestations of their mental illnesses and physical conditions reflecting their mental states. If shock treatment were recommended, the patient would usually be 3 to 6 weeks in hospital before the treatment was instituted, during which time he received such general or specific treatment as was indicated. Since the inauguration of the new method, many of those patients who would ultimately recover,¹ now did so before the usual three to six weeks had elapsed, and were practically convalescent even before they came to staff meeting. Again instead of passing 3 to 6 weeks in delirious states, necessitating continuous baths, gavages, restraint, seclusion, etc., they were now accessible to psychotherapy, occupational therapy, and were generally readjusting themselves for their return to civil life. Although it may take 3 to 4 weeks to complete the study of the patient and of those factors which play a part in the etiology of the disease, a diagnosis for therapeutic purposes can usually be made within 48 hours, and other things being equal,

no further loss of time is warranted in instituting shock treatment. Finally, at the staff meeting, instead of using this period in examining the patient's mental condition, which has already been thoroughly done, the time was constructively used in discussing with a relatively well or cured patient his problems and himself, with benefit to both patient and staff.

Table I illustrates the results of electrotherapy on recent admissions with psychogenic disorders.

INDICATIONS AND CONTRAINDICATIONS FOR SHOCK TREATMENT

Most patients with psychogenic disorders admitted to this hospital receive some form of shock treatment, provided there is no absolute contraindication found on physical examination. Specifically, other things being equal, shock therapy is indicated in all cases of psychogenic mental disorder, such as the various types of manic-depressive psychosis, involutional melancholia, schizophrenia, paranoid states, and certain types of psychoneurosis. Mental disorders associated with the puerperium and other exhaustive conditions, and some form of toxic deliria are also indications for shock treatment.

Absolute contraindications are active pulmonary tuberculosis; acute pulmonary disease, or any acute systemic infection, at least until complete recovery has taken place; myocardial decompensation; advanced diabetes; malignant hypertension or any other organic disease which already threatens the life of the patient. Disease of the vertebræ and of other bony tissue, although relatively rare, would need careful consideration before treatment could be given. On the other hand, organic disease associated with mental symptoms should not automatically contraindicate shock, and each case must be judged separately and on its own merits, as, for example, patients with heart disease, bone disease, disease of the nervous system, etc., have been successfully treated with various forms of shock treatment in our series of cases, without detrimental effects to the physical condition. In fact, the patient's delirium is often more exhausting and injurious to his physical condition than is shock treatment. A brief summary of the following cases illustrate this point.

TABLE I.

Diagnosis	No. treated	Re-covered	Much improved	Improved	Unimproved
Schizophrenia....	107	38	18	5	46
Manic-dep. psy....	95	74	14	3	4
Inv. melancholia..	20	12	3	2	3
Psychoneurosis...	12	5	5	1	1
Paranoid state...	2	..	..	..	2
Psy. with psychopathic personality.....	1	1	..	..	..
Undiagnosed*....	5	2	1	1	1
Totals.....	242	132	41	12	57

*It was impossible, even after prolonged and careful observation, to come to a definite diagnosis in any of these cases. A combination of toxic, schizophrenic, hysterical and manic features were present but no one definite trend was ever established.

CASE 3

Mr. E.W., aged 17, diagnosis, schizophrenia, catatonic type. Physical examination showed no abnormality. X-ray examination of spine was interpreted as follows: "Lumbar spine normal. In the dorsal spine there are extensive morbid changes of the intervertebral discs involving the whole dorsal spine. The intervertebral spaces are markedly narrowed and very irregular in outline. Shock therapy is contraindicated." This patient's mental and physical findings were carefully reconsidered, and it was decided to administer electroshock with curare to "soften" the convulsion. He received 20 convulsive treatments without detrimental effects to his spinal condition.

CASE 4

Miss M.McD., aged 38, diagnosis, schizophrenia, paranoid type. This patient had a head injury at birth, resulting in a spastic paralysis of the right arm and leg. As her mental symptoms were very acute on admission, shock therapy was administered to her in conjunction with curare without ill effect, objectively or subjectively.

CASE 5

Mrs. O.A.C., aged 33, diagnosis, schizophrenia, catatonic type. This patient's mental condition was complicated by a four and one-half months' pregnancy, the fifth in four years. Electroshock was administered in conjunction with curare without any untoward effect.

CASE 6

Mrs. E.K.T., aged 37, diagnosis, paranoid schizophrenia. History of rheumatic fever. On admission patient had oedema of both legs, moderate ascites, some enlargement of the heart to the left of the mid-clavicular line and a systolic murmur over the apex conducted to the left. She was admitted on July 14, 1945, and by August 23 all evidence of cardiac decompensation had disappeared. She was considered suitable for electroshock treatment and received a full course without any unfavourable effect.

COMPLICATIONS OF CONVULSIVE THERAPY

The commonest complication is compression fracture of one or more thoracic vertebræ. Many patients are unaware of the compression and have no local symptoms or signs. Others complain of "pain in the back" but are not otherwise incapacitated. Many patients also complain of backache whose vertebræ show no evidence of compression. This condition is not regarded as serious at this hospital, the patient is not alarmed by anatomic or pathologic explanations and shock therapy is continued without interruption.

Fractures of the humerus, femur or other long bones, although very rare, occur occasionally and receive appropriate care. Convulsive therapy is usually discontinued in this type of case, at least until the fracture has healed when the pros and cons of giving shock therapy can be reviewed. One patient only, in our series, sustained a fracture on convulsive therapy, serious enough to interfere with his treatment. He made a good recovery with slight limitation

of movement in the right hip joint. He had a complete course of insulin at a later date.

Amnesia, of varying degrees of intensity, is met with but, in our experience, is completely reversible. Severe amnesia usually clears up in a week or two but the minor degrees, such as forgetting people's names, etc., may persist for many months.

ELECTROSHOCK OR INSULIN SHOCK?

While convulsive shock therapy appears to be the treatment of choice in affective psychoses, there is no unanimity of opinion regarding the choice of shock therapy for the schizophrenic condition. Some believe that insulin therapy should be reserved for the treatment of schizophrenia, and that convulsive shock has little therapeutic value in this condition. Others believe that convulsive shock is as efficacious as insulin therapy in all respects. At the Ontario Hospital, London, all patients selected for shock therapy are, with few exceptions, treated first with electroshock until (a) there is clinical recovery or the greatest possible improvement. In the majority of affective conditions and in many diagnosed as schizophrenia, between three and twenty convulsive treatments usually suffice; (b) twenty convulsive treatments have been given without improvement in the mental condition. This latter finding is more commonly met with in those patients manifesting schizophrenic than manic-depressive deviations. From the group of schizophrenic patients not recovering on convulsive therapy are selected the candidates for insulin therapy, preference being shown for those with the most satisfactory pre-morbid personality integration.

All suitable schizophrenic patients therefore, receive the quickly acting economic electrotherapy first. The more slowly acting, expensive insulin therapy is held in reserve for suitable electroshock failures, and for the treatment of schizophrenic patients physically unsuited for convulsive therapy. It is admittedly the case, that certain types of schizophrenic patients recover or markedly improve on insulin therapy when they fail to do so on electroshock, as noted in our series of cases, but it is also our experience that similar clinical types recovered or markedly improved on convulsive shock alone. The diagnosis of types of schizophrenia, *e.g.*, catatonic, paranoid, hebephrenic, *et al.*, is after all just a point of view,

and it is our opinion that the diagnosis, even in conjunction with good pre-morbid personality factors, should not be the only factor considered when selecting the type of shock therapy. The degree of recovery of the schizophrenic patient, when spontaneous, might be less than that resulting from shock therapy, but it would be difficult in a great many instances to differentiate between electroshock and insulin recoveries. It is our opinion that those who were unresponsive to convulsive therapy and who now fail to recover on insulin therapy, are likely to form part of the permanent hospital population, but at least they will have had the benefits of all accepted forms of shock therapy. Table II illustrates the results of shock therapies in patients diagnosed schizophrenia.

TABLE II—"A"

Number on convulsive therapy	107
Improved—At home.....	49
—In hospital.....	12
Unimproved—"convulsive shock failures"	46

TABLE II—"B"

"Convulsive shock failures" on insulin.....	32
Improved—At home.....	12
—In hospital.....	6
Unimproved.....	14

Of the 46 "convulsive shock failures" in Table II "A", 32 were suitable for insulin and 14 unsuitable.

Of 107 schizophrenics treated with convulsive shock and 32 selected "convulsive shock failures" treated with insulin, 61 returned home, 18 remained in hospital in improved health and 28 were unimproved.

We conclude from these results, (1) that it is easier and more economical to treat all schizophrenic patients with electroshock than to treat selected schizophrenic patients with insulin, (2) that the results of electroshock warrant the continued use of this therapeutic measure in schizophrenic patients before using insulin, (3) that insulin speeded up the improvement of some patients unresponsive to electroshock, (4) the value of insulin in schizophrenia is better assessed when used on "electroshock failures", than when used exclusively on non-convulsively treated patients, (5) that the results obtained in schizophrenic patients by the therapeutic procedure described above compare very favourably with the results of treating all or selected schizophrenics with

insulin alone, with considerable saving in time and material.

It is appropriate to mention at this time, that since the inception of the clinic, only 7 patients received insulin shock without a previous complete course of electrotherapy. Four patients of this group (Cases 7, 8, 9 and 10) presented somatic conditions contraindicating convulsive shock therapy. Two cases were interesting from the psychiatric viewpoint, in that they were siblings, voluntary admissions, early cases of schizophrenia, the third and fifth of five siblings all of whom were, or still are, in Ontario Hospitals with schizophrenia. They received insulin therapy without previous electroshock, because of the popular concept that insulin is the treatment of choice in early schizophrenia with acute onset, etc. One sibling returned home but her symptoms returned. The other sibling did not respond and is still in hospital.

CASE 7

Miss H.M.W., aged 22, diagnosis, hebephrenic schizophrenia, duration of illness, 3 months; mode of onset, sudden.

This patient had tuberculosis of the right hip at the age of 4 years with periods of flare-up. A fusion operation was performed in 1941 with complete ankylosis of the joint. She received a complete course of insulin therapy and had in all 60 comas. There was no improvement in her mental condition, but her physical condition was unaffected by this form of treatment.

CASE 8

Miss R.N.J., aged 17, diagnosis, schizophrenia, duration of illness, 3 months; mode of onset, sudden.

This patient was recommended for electrotherapy, but x-ray of her spine showed a condition which was diagnosed by our consultants as tubercular epiphysitis. Electroshock therapy was contraindicated. As the patient's mental condition was rapidly becoming worse insulin therapy was instituted. Her mental condition rapidly improved without any ill-effect to her physical condition.

CASE 9

Mrs. A.V., aged 34, diagnosis, schizophrenia, catatonic type; duration of illness, 2 months; onset, sudden.

The patient developed pulmonary tuberculosis in the right lung nine years ago, and has been receiving artificial pneumothorax at monthly intervals. This condition was considered a contraindication to all forms of shock treatment, but as her mental condition became more acute she was placed on insulin therapy and made a complete recovery. Her physical condition was in no way affected.

CASE 10

Miss M.S.G., aged 22, diagnosis, schizophrenia, paranoid type; duration of illness, 2 months; mode of onset, insidious.

This patient suffered from spina bifida occulta and had marked atrophy of muscles and bones of both legs. Shock therapy was contraindicated, but as her mental condition became worse, insulin therapy was instituted. Her mental condition rapidly improved without any ill-effect to her physical condition.

From November, 1944 to July, 1945, the insulin-treated group received insulin subcutaneously. The number of comas induced varied from 20 to 60 comas, according to the individual requirements, and if no improvement occurred after 60 comas insulin was discontinued. Sub-coma insulin was used on a number of patients (27) over a period of months, but other than a general gain in weight there was little improvement in the patient's mental condition.² A percentage of patients required large amounts of insulin to insure deep coma, and insulin reactions and comatose states were common in the afternoons and evenings, interfering with other forms of therapy. In an attempt to eliminate these unwelcome reactions, it was decided to administer the insulin intravenously and to compare the results with those of the former method of administration.³ When insulin was given intravenously, a smaller amount induced coma in the majority of cases, *e.g.*, one patient with his first course of insulin required 280 units of insulin subcutaneously to insure deep coma, and with his second course, nine months later, required 220 units intravenously to obtain the same effect. There was a saving of 60 units of insulin a day or 300 units per week. The economy of this method in a large group of patients needs no further discussion. The average pre-coma period was also shortened by this new method of administration, *e.g.*, when given subcutaneously coma dosage was reached in 33 days when given intravenously in 20.5 days. Late reactions were less common and hypoglycæmic excitement markedly reduced. There was nothing noted in the clinical or post-clinical observations indicating better results with one or other method.

COMPLICATIONS OF INSULIN THERAPY

As already mentioned, delayed hypoglycæmic reactions and comas were fairly frequent during the months insulin was administered subcutaneously. This was to a great extent overcome by administering insulin intravenously. Anaphylactic phenomena, tachycardia and other cardiac irregularities were encountered during the actual treatment but usually responded to glucose medication. No other complications occurred during the year. Serious complications such as prolonged coma,⁴ insufflation pneumonia are rarely met with but receive mention in the literature.

"INTENSIVE" ELECTROTHERAPY

All recent admissions to the shock therapy division receive convulsive shock twice weekly. In specially selected cases, *e.g.*, delirious mania, metrazol or electroshock is administered daily, as mentioned above, until the patient recovers or improves. Within recent months two, three or four electroshocks per day have been given to acutely delirious patients, with results suggesting further investigation of this method of administration. Two cases so treated are mentioned as illustrations.

CASE 11

Mrs. M.Y., aged 60, diagnosis, manic-depressive psychosis, mixed type; duration of illness, 3 years. She was admitted to hospital on October 6, 1945, in a state of extreme agitation and depression. On October 7, she received 4 electrically induced convulsions when her agitation and depression were dissipated and no further electroshock was necessary.

CASE 12

Mrs. A.L., aged 53, fifth admission, diagnosis, manic-depressive psychosis, manic phase. On October 4, 1945, she received 2 shock treatments, 3 shock treatments on October 6 and 4 shock treatments on October 7. There was immediate dissipation of her manic symptoms, and no further shock treatment was necessary.

CONVULSIVE THERAPY AND THE PATIENT WITH LONG-STANDING MENTAL DISORDER

An important function of the shock clinic is the weekly treatment of long-standing mentally ill patients who are impulsive, destructive, noisy, violent, restless and in other ways constitute a major nursing problem on the wards. A list of such patients was prepared and 30 patients were immediately placed on weekly electroshock treatment. As the patient's behaviour showed improvement she was placed on a rest period and the vacancy was taken by another patient on the list. When a patient relapsed into her former condition—usually 1 to 12 weeks after cessation of treatment—she was returned to the active list. By this method of rotation 107 patients from the women's division and 44 from the men's division received convulsive shock treatments during the year. If no improvement in the patient's behaviour resulted after 20 weekly shock treatments, this patient was removed from the list and another patient substituted. If a patient showed more than improvement in behaviour, she was transferred to the active list and shock treatment and other therapies intensified. The following brief histories indicate some of the encouraging results obtained.

CASE 13

Miss A.R., aged 45, diagnosis, paranoid schizophrenia, duration of illness, 6 years. After electroshock treatments this patient showed much improvement in her condition. Although not fully recovered her improvement justified a trial away from hospital. She has been discharged and is now self-supporting.

CASE 14

Miss D.B., aged 36, diagnosis, schizophrenia, catatonic type; 4 years in hospital. This patient has been a major nursing problem for years. She broke 5 or 6 windows weekly, mutilated her body with pieces of glass and had many scars. She was violent and impulsive and had to be constantly secluded. She was placed on shock therapy in November, 1944, and this treatment was given at intervals until August, 1945. Since this time shock therapy has not been necessary. She is able to attend all social activities.

CASE 15

Mrs. J.M., aged 71, diagnosis, manic-depressive psychosis, manic phase, 20 years in hospital. This patient had recurrent manic attacks lasting on an average of 3 to 8 months every 5 to 8 months. Her latest manic attack was dissipated in 4 days and she has remained well mentally since then.⁵

Table III indicates in figures the results of treating 151 long-standing mentally ill patients with electroshock.

TABLE III.

	Women	Men	Total
Number.....	107	44	151
Recovered.....	1	4	5
Much improved.....	12	1	13
Improved.....	58	16	74
Unimproved.....	31	20	51
Worse.....	5	3	8

It is open to question whether "the long-standing mentally ill patient has solved his problems and now leads a happy existence". This concept or rationalization results in the forgotten patient and in therapeutic nihilism. None of the 151 patients treated with shock could be regarded as happy, if violence, impulsive behaviour, deteriorated habits, poor physical health, etc., are used as criteria of happiness. Shock treatment, given consistently, has mitigated many of the behaviour disorders and ameliorated the emotional and physical conditions of the majority of patients treated, and it is planned to steadily increase the number of long-standing cases on shock and other therapies.

DRUGS USED WITH ELECTROSHOCK THERAPY

1. *Curare*.—The literature on the subject discusses the value of this preparation in conjunction with convulsive therapy in reducing the number of vertebral and other fractures.⁶ It has also been reported, that curarization makes

possible electroshock treatment to mentally ill patients, with physical diseases serious enough to otherwise contraindicate such therapy, *e.g.*, cardiovascular diseases.⁷ Curare was used for a period of six months on all patients receiving shock therapy, but for the following reasons was finally limited to young heavily muscled male patients, and to certain patients showing physical conditions otherwise contraindicating shock treatment, as in Cases 3 and 4: (a) The induced convulsion in the majority of women patients is "soft", and an investigation of the number of vertebral compression fractures and other fractures, in curarized and non-curarized patients, demonstrated that there was no significant decrease in the number of fractures when curare was used. (b) There seems little indication, after years of convulsive shock therapy, that vertebral compression fractures have any immediate or remote physical or psychological effect on the patient, and to complicate the therapy with curare is therefore unjustifiable. (c) The main reason why curare has a limited use at this hospital, is contained in a report to the Department of Health of Ontario, on an investigation of the blood pressure changes in curarized and non-curarized patients receiving electroshock therapy.⁸ Our findings indicate that in the presence of initially increased blood pressure, significant post-convulsive rises in blood pressure occur in curarized patients. Patients in the older age groups and patients showing cardiovascular disease, if recommended for convulsive shock, do not receive curare, and our findings make the continued use of this preparation untenable except in selected patients.

2. *Sodium amytal*.—All patients showing apprehension, fear or other mental states which increase the mental and physical hazards of convulsive shock treatment, receive sodium amytal in doses varying from 3 to 12 grains about an hour before the treatment is given. In some cases oral administration is impossible when the intravenous route is used, injecting the solution slowly until there is light hypnosis. Opium and its alkaloids and hyosine are avoided as much as possible, but are used when all other methods of sedation fail. The heavier the sedation the greater is the voltage or amperage required to induce convulsions.

3. *Insulin*.—Insulin is of value as a sedative in excited or apprehensive patients, and can be

used in hypoglycæmic doses, *e.g.*, 10 to 50 or 100 units given each morning. Besides sedating the patient it also has a beneficial effect on his physical condition. Electroshock has been given frequently to patients in hypoglycæmia and insulin coma, but under ordinary circumstances satisfactory results are obtained with barbiturates.

4. *Benzedrine sulphate*.—It has been observed that patients become resistant to electroshock when the therapy has been continuous over a prolonged period, until ultimately it is impossible to induce a convulsion. Benzedrine sulphate in 10 mgm. doses one hour before treatment is very effective in eliminating this difficulty.

PSYCHOSES ASSOCIATED WITH ORGANIC BRAIN CHANGES

The senium, *per se*, in the presence of mental disorder is not necessarily regarded as a contraindication to shock therapy. Special clinical acumen is necessary in the selection of such cases for treatment, as the hazards undoubtedly increase with ageing blood vessels. Cerebral arteriosclerosis, with or without hypertension, is common after the age of 60, but in the absence of memory defect, disorientation and other marked signs of organic brain disease, and in the presence of acute mental disorder, shock treatment should receive serious consideration.⁹ It is our opinion that a patient in the senile period, with a mental condition characterized by prolonged agitation or excitement, is in greater danger from his mental condition than he would be from shock treatment. Our observations indicate that patients between 50 and 75 years of age, with depression or excitement, can be safely treated with electroshock if no other gross physical abnormality be present. The underlying organic condition is, of course, uninfluenced by shock therapy; any accompanying delusional system persists, but the affective component—excitement, agitation or depression—is very often dissipated and the patient rendered much more comfortable. The following case reports indicate the type of patient in this group benefiting by electrotherapy.

CASE 16

Mrs. J.M. (mentioned above). This patient was over 71 years old, with generalized arteriosclerosis and a blood pressure of 170/110. She completely recovered from a manic attack after several electroshocks.

CASE 17

Mrs. L.S., aged 65, diagnosis, psychosis with cerebral arteriosclerosis. She had generalized arteriosclerosis with a blood pressure of 170/96. She had persecutory delusions and was depressed and agitated. Since receiving electroshock she has been friendly, cheerful and co-operative.

These observations also apply to patients suffering from general paresis, the only other type of patient with organic brain disease treated with convulsive shock during the year, *viz.*:

CASE 18

Mrs. O.I.K., aged 47, date of admission June 12, 1945. This patient showed symptoms of acute excitement suggesting, tentatively, a diagnosis of manic-depressive psychosis, manic phase. No physical abnormality was noted on examination. She received 4 electroshocks and recovered from her excitement. Several days after the institution of this therapy the routine C.S.F. report was received showing the typical parietic curve, which was confirmed. Careful physical and neurological examinations again showed no clinical evidence of organic disease. This patient left the hospital without any symptoms of excitement.

FOLLOW-UP PROCEDURE

When the patient is considered well enough to resume his activities in the community, the salient features of the illness and causal factors are again reviewed with him. As the patient will return to the same environment wherein his illness developed, besides preparing him to meet this situation in a healthy manner, he is instructed in the procedures to adopt should his mental symptoms return. The idea of returning, on an out-patient basis, for advice, electroshock or other treatment, is not at all distasteful. He has, from real experience, exploded the myths centring around mental institutions. Patient and relative are advised as to the Mental Health Centre nearest their home, and informed that the patient will be interviewed at intervals by members of the hospital staff. The patient is also advised as to the value of regularly contacting his family doctor, who has been notified of the patient's condition, treatment in hospital and the facilities available for post-hospital care. We are forced from wide experience, to stress as much as possible the importance of suitable after-care in the prevention and earlier recognition of relapses.

PROPHYLACTIC ELECTROTHERAPY

Every psychiatric hospital is familiar with the patient who has recurrent attacks of affective mental disease, requiring periods of hospitalization once or oftener each year. As already stated, electroshock and other therapies

rapidly restore the majority of these patients to good mental health but, within a short time, some are returned to hospital with a second or third attack of their mental disease. From the necessity of doing something more for this type of patient after leaving hospital, materialized what is termed at this clinic "prophylactic shock treatment". This form of preventive treatment, the author believes, was first suggested by Dr. G. H. Stevenson, Superintendent of this Hospital. In August, 1944, before the shock service was operating, Dr. Stevenson advocated (1) that all suitable patients, with histories as described above, return to the hospital once a month for electroshock treatment and (2) that this plan be extended over a five year period. He was of the opinion that as electroshock quickly dissipates manic excitement or depression in the advanced or clinical state, it should act in a similar way in the sub-clinical state, or prevent altogether the return of mental symptoms, thus obviating a return to hospital. This plan was also extended to the relapsing patient with schizophrenic disease. A list of such patients was compiled from the hospital records, and this prophylactic procedure was explained to each one personally, if possible, or by letter. Relapsing patients then in hospital also were advised of this plan, and were encouraged, on leaving hospital, to return for monthly electrotherapy. It was difficult to persuade all patients to co-operate in this experimental procedure, as some were afraid of electrotherapy, others were without initiative and others still without insight.

When the patient reported for treatment, it was fully explained that prophylactic shock was not an absolute guarantee against future relapse, but an experiment in preventive medicine well worth trying. The most he could lose, economically, was 12 days per year for 5 years, whereas the gain might be complete freedom from mental symptoms. Furthermore, it was explained, regular visits to the clinic would enable the therapist to note early manifestations of illness, and allow of a more intensive form of shock therapy, e.g., 2 or more treatments per week. The import of this form of after-care for the patient with a tendency to relapse, can be appreciated by scrutinizing the data presented in Table IV. These facts were taken from the records of two patients on prophylactic treatment, and are very representative of the whole situation.

TABLE IV.

THE REASON WHY PROPHYLACTIC ELECTROTHERAPY WAS INSTITUTED

	Name	
	Mrs. A.L.	Mrs. E.B.
Age.....	53	45
Diagnosis.....	Man. dep. man.	Man. dep. man.
No. of admissions since 1st attack...	1941-1945 (5)	1943-1945 (5)
Total days in hospital	335	392

When the clinic commenced operations in November, 1944, 36 relapsing patients were invited to attend for prophylactic shock treatment. During the course of the year suitable patients were added to the list, and by the end of the year 46 patients were being regularly contacted by letter and social workers. Eleven women and five men attended regularly during the year and have remained well to date. We cannot claim, however, that they remained well because of monthly electroshocks or monthly discussion and advice. On the other hand, we can claim, from patients' own statements, that they feel well, have a sense of security and a definite increase in self-confidence as the months go by without relapse. Many are as keen as the therapist in following the experiment to the end, and state they have lost the old feeling of shame at coming to a mental hospital for treatment. We also believe from our one year's experience, that those who attended regularly, and are still attending, have complete insight into their conditions, and that their chances of continued good mental health are excellent, and that the opposite is the case of those who refused to help themselves. We hope that after a period of five years, sufficient data will have accumulated to accurately assess the value of this form of therapy. A preliminary report is meanwhile in order and the figures for the year are reported in Table V.

TABLE V.

No. on prophylactic list...	36	Remained well	Relapsed
No. attending regularly...	16	16	..
No. not attending.....	20	16	4

A small number of first admissions (9) developed mild mental symptoms shortly after leaving hospital. All these patients attended for Out-Patient electrotherapy, and it was unnecessary to hospitalize any of them.

RESULTS

Table VI summarizes the results of shock therapies given at the clinic from November, 1944 to October, 1945.

TABLE VI.

A.—RECENT ADMISSIONS, CONVULSIVE SHOCK AND/OR INSULIN

Diagnosis	No. treated	Re-covered	Much improved	Improved	Unimproved
Schizophrenia....	114	47	22	14	31
Man. dep. psy....	95	74	14	3	4
Inv. melancholia..	20	12	3	2	3
Psychoneurosis...	12	5	5	1	1
Paranoid state...	2	..	..	..	..
Psy. with psychopathic personal-ity.....	6	5	..	..	..
Undiagnosed psy..	5	2	1	1	1
Psy. with mental deficiency.....	6	5	..	1	..
Totals.....	255	146	45	22	42

B.—OTHER PATIENTS TREATED

Long-standing mentally ill.....	151	Electroshock and/or metrazol			
Senile psychoses par. type.....	1	"	"	"	"
Psy. with cerebral art.	2	"	"	"	"
General paretics.....	2	"	"	"	"
Recent and long-standing cases.....	27	Subcoma insulin			
Attending O.P.D. for electrotherapy:					
(1) Prophylactic..	22	Electrochock			
(2) Others.....	9	"			
Totals.....	214				

C.—Total number on the various forms of shock therapies during the year..... 469

CONCLUSION

A shock therapy division has been in operation at the Ontario Hospital, London, from November, 1944 to October, 1945. In this period 469 patients received shock therapy. Our observations have led to the following conclusions:

1. That a well equipped shock therapy unit is an important part of a mental hospital's treatment facilities.

2. That the duration of mental illness in many cases is greatly shortened by early shock therapy.

3. That many long-standing or chronic cases of mental illness are symptomatically improved by shock therapy.

4. That the dangers of shock therapy are minimal in properly selected cases and that many cases, complicated by hypertension, ad-

vanced years, arterial degeneration and even considerable heart disease, can receive shock therapy safely.

5. That electroshock is, in most cases, the shock treatment of choice, reserving insulin only for those who do not respond to electroshock. Metrazol is indicated only in those cases who, for one reason or another, cannot readily attend the shock clinic.

6. Mental disease complicating certain organic or toxic reactions may be symptomatically improved by shock therapy.

7. Curare, although recommended by some workers, has not proved of sufficient value in our hands to warrant its continued use, except in rare cases.

8. That the investigation of the value of prophylactic shock treatment be continued on suitably selected cases.

I should like to express very sincere appreciation to the Superintendent of the Ontario Hospital, London, Dr. George H. Stevenson, for his constant interest and advice in the therapeutic program outlined in this report.

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RÉSUMÉ

Le présent article est basé sur l'observation de 469 malades traités par les diverses choc-thérapies depuis 1944. Ce mode thérapeutique permet, après un recul de 2 ans, d'affirmer les propositions suivantes:

La choc-thérapie constitue maintenant un aspect thérapeutique indispensable à tout tout hôpital psychiatrique bien organisé. La durée de certaines maladies mentales est souvent notablement écourtée par les chocs. Plusieurs états mentaux de longue durée sont cliniquement améliorés par cette thérapeutique. Les dangers de ce mode de traitement sont minimes et il est possible de l'appliquer aux cardio-rénaux si les cas sont bien choisis et étudiés. L'électro-choc est le traitement de choix; l'insulino-choc sera réservé aux malades résistants aux électro-chocs ou à certaines psychoses où cette thérapeutique est plus particulièrement indiquée, la schizophrénie par exemple. Les réactions psychosiques dues à certaines infections ou intoxications bénéficieront des chocs. Le curare ne sera qu'exceptionnellement utilisé comme adjuvant de la choc-thérapie. Les chocs sont étudiés dans la prophylaxie de certains états mentaux. JEAN SAUCIER

SEBORRHŒIC DERMATITIS

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SEBORRHŒIC dermatitis is one of the most commonly encountered dermatoses. It may vary from a mild type to one severe enough to be totally disabling. It may present as a simple scaling patch on chest or back, or be so bizarre in character as to be the unexplained factor of a constantly recurring impetigo of the scalp, or folliculitis of the beard.

It is accepted by most authorities today that seborrhœa is a necessary prerequisite to seborrhœic dermatitis. Seborrhœa, so named by Fuchs in 1840, has been aptly defined by MacLeod.¹ "Seborrhœa, or flux sebacea, is an excessive output of sebum by the sebaceous glands, and is a functional disturbance rather than a disease." Sebaceous glands are large and numerous in the scalp, central area of the face, beard, sternal and interscapular areas, lower part of the sacral and pubic areas. It has long been thought that they are devoid of nerve supply. Recently, however, it has been shown that changes in their secretion occur with certain nervous lesions.^{3, 4} Sebum is a true secretion containing fatty acids combined with higher alcohols, including cholesterol. Unna² believed that the sweat glands supplied small amounts of fat to the sebum.

Seborrhœa may occur prior to birth (vernix caseosa), during infancy (as oiliness of the face especially, or miliary acne), but is especially noted at the time of puberty. There are many factors which predispose to it. Increase in number and size of sebaceous glands under the influence of androgenic hormone, is probably the one of prime importance.⁵ Others are: heat and exercise (with hyperhidrosis), anxiety, alcohol, certain foods (excesses of carbohydrates and fats, pork, chocolate, nuts, certain sea foods). It has been noted too, that a persistently acid urine occurs with most cases of frank seborrhœa.⁶

It is upon the fertile soil provided by sebum that the organisms responsible for seborrhœic dermatitis thrive. These are: (1) the *Pityrosporum ovale* (flask shaped bacillus of Unna, bottle bacillus of Sabouraud), which is actually a fungus of the family Cryptococcaceæ; (2) the microbacillus of Unna and Sabouraud (*Bacillus*

acnes of Gilchrist); (3) the *Staphylococcus epidermidis albus* of Welsh (the grey bacillus). It is now felt that the organism of most importance in the production of seborrhœic dermatitis is the *Pityrosporum ovale*.^{7, 8, 9}

The exact mechanism of production of the dermatitis has not been fully determined. It has been shown¹⁰ that actually more of the *Pityrospora* may be cultured from the skin of normal scalps, than from those showing clinical seborrhœic dermatitis. It is noted that many cases of frank seborrhœic dermatitis are ushered in by an attack of superficial pyogenic infection which will clear only when the underlying seborrhœa is adequately treated. I feel that seborrhœic dermatitis is most probably a cutaneous expression of an allergic reaction to organisms, chiefly *Pityrosporum ovale*, found on the skin of seborrhœic individuals; and that the precipitating factor of such a dermatitis is often an attack of a superficial pyogenic infection. The allergic hypothesis is not a new one, and has been suggested by Ravaut.

The most inclusive work on seborrhœic dermatitis has been done by Unna,¹¹ and reviewed by Elliott.¹² An excellent clinical description has been given by Darier.¹³ The following types are taken, in the main, from that text.

1. Seborrhœic dermatitis of the scalp. This is most often seen as a dry scaling dermatitis (dandruff) associated with some itching, but in addition there may be erythema with serious oozing. Similar changes may occur in the eyebrows, and along the margins of the eyelids. There is often a tendency for areas of the face (naso-labial folds, corners of the mouth, post-auricular folds) as well as the external auditory canals, to become involved.

2. Figurate seborrhœic dermatitis. The sites of election are the presternal, interscapular areas, and the hair margins. The initial lesion is a dry red papule or group of papules. By addition of fresh papules the lesion spreads centrifugally, leaving a central fawn coloured greasy scale.

3. Pityriasisiform seborrhœic dermatitis. The lesions are dry scaling patches, not unlike those seen in pityriasis rosea, occurring on the chest, back, abdomen, and occasionally the arms. The dermatitis is symmetrical and may involve flexures and palms.

4. Perifollicular seborrhœic dermatitis. This is a subacute follicular papular dermatitis seen

on presternal and interscapular areas. It commonly occurs in subjects with hyperhidrosis.

5. Psoriasiform seborrhœic dermatitis. This is a papular dermatitis involving, primarily, seborrhœic areas. Clinically it is not distinguishable from true psoriasis.

6. Exfoliative seborrhœic dermatitis. In this type follicular papules coalesce until large areas of skin are involved and desquamate. It may occur in secondarily infected cases which are over-treated. Pringle described a special type of seborrhœic dermatitis of the face in which there occurred large numbers of miliary perifollicular papules. It is felt by some today that staphylococcal folliculitis of the beard is actually a secondarily infected seborrhœic dermatitis.

In the differential diagnosis one must mention the following: pityriasis rosea, tinea circinata, roseolar secondary syphilis, eczema marginatum, erythrasma, eczematized circumscribed prurigo. Histologically, in even the mildest types of seborrhœic dermatitis one sees parakeratosis, acanthosis, spongiosis in the stratum mucosum; with œdema of the dermis, and perivascular infiltration. It is said (Civatte) that microscopically one can distinguish true psoriasis from psoriasiform seborrhœic dermatitis in that in the latter there is more spongiosis, and the spongioid areas are filled with mononuclear cells instead of polymorphonuclears, as is the case in true psoriasis.

TREATMENT

Treatment resolves itself in four ways: (1) prophylactic; (2) anti-infectious; (3) anti-seborrhœic; (4) anti-allergic.

1. As in many other conditions prophylaxis is most important, yet is often little recognized until the time when its usefulness has, to a degree, passed. Most important in prophylaxis is the liberal use of soap and water. Any mild soap is good, and should be used several times a day in those showing much seborrhœa. For those showing less seborrhœa, or whose skins tend to become dry or irritated with frequent soap and water cleansings, a superfatted soap, or one of the newer wetting agent soaps may be used. The use of cleansing creams is usually contra-indicated in seborrhœic individuals. Care of the scalp is of the greatest importance. It should be cleansed with a mild shampoo several times weekly. At the earliest sign of flaking,

anti-seborrhœic measures should be applied (*vide infra*). Attention to errors of diet, particularly overeating and overdrinking, investigation and correction of gross errors of metabolism, are of lesser importance. Prophylaxis is of most value during adolescence, and in situations where overcrowding exists (*e.g.* service institutions).

2. If a pyogenic infection (commonly caused by *Staph. pyogenes* or streptococci) has ushered in, or complicated, a seborrhœic dermatitis, it is necessary to treat this before coping with the seborrhœic dermatitis itself. If the infecting organism is penicillin-sensitive, penicillin cream, spray, or intramuscular penicillin is the treatment of choice. One must ascertain, of course, that the patient is not allergically hypersensitive to penicillin. If the organism is penicillin insensitive, a preparation of one of the newer drugs (*e.g.* streptomycin), or one of the older drugs (ammoniated mercury, brilliant green, D'Alibour's solution) may be used. A sulfa drug in the treatment of an infected seborrhœic dermatitis, should almost never be used. Should such an occasion arise however, use should be discontinued after five days. If the secondary infection has produced a weeping eczematous dermatitis, the best initial local therapy is continuous cold compresses. These may be saturated boric acid solution (not advised in infants because of toxic absorption), a solution of 1:10,000 potassium permanganate, 1:20 Burrow's solution, 1:500 silver nitrate.

3. Once the secondary infection has been controlled, anti-seborrhœic measures should be introduced. Locally, Unna and Winkler¹⁴ advocated use of the following drugs, in order of merit: sulphur, resorcin, chrysarobin, ichthyol, salicylic acid, pyrogallol, mercurials, tar. Various areas, it is often found, differ in their response to therapy. Scalps with short hair respond well to a combination of sulphur and salicylic acid (3% of each) in an ointment base (lanolin and petrolatum, eucerin, or a wetting agent base). On scalps with long hair a 70% alcoholic lotion containing resorcin, salicylic acid (1.6% of each) mercuric chloride (0.08%) and castor oil (1.2%) is best indicated. (In blondes the resorcin should be replaced with chloral hydrate). Seborrhœic dermatitis of the external auditory canal always presents a problem. The author uses a gauze strip soaked in a solution of 10% ichthyol in normal saline, and lightly packs it into the canal. When

swelling of the wall has subsided the solution is changed to ichthyol (10%) in glycerin. The glabrous skin, if very oily, responds to sulphur (2%) and resorcin (0.5%) in calamine or neocalamine lotion. Drier skins respond to sulphur (0.5 to 1%) in calamine or neocalamine linament. Some prefer,¹⁵ especially about the face, sulphur (1 to 2%) in one of the newer emulsion bases. In the articular folds a preparation¹⁵ which has proved efficacious is crude coal tar (0.2 to 0.5%) in a lanolin-unguentum zinc oxide base. Seborrhœic dermatitis of the eyelids may be treated with 2% yellow oxide of mercury, or the mild crude coal tar preparation above mentioned. Ultra violet therapy is of value in conjunction with other local treatment, and should be given as mild erythema doses three times weekly.

In the psoriasiform type, treatment as advocated by Goeckerman and modified by Paul O'Leary produces the best results. In those cases of seborrhœic dermatitis which have received other types of local therapy, and still fail to respond, superficial x-ray therapy is indicated. Factors recommended are 85 KV., 4 ma., no filtration, anode skin distance 10 inches. With these a dosage of 75r is administered every 5 to 7 days for 6 doses. This amount may be repeated in 6 months. No area of skin should receive more than 1,200r. Care, especially about the centre of the face, should be taken in respect to exit dose and backscatter.¹⁶ In the general treatment, various food factors (*vide supra*) should be explained to the patient, and a conscientious attempt made to correct any dietary errors. Endocrine therapy, in the form of œstrogenic hormone has been tried with varying success. If used, some care should be exercised, as severe benign bleeding has occurred.¹⁵ Vitamin B complex is recommended, and many feel that its important factor is pyridoxine hydrochloride. Wright, Samitz and Brown¹⁷ suggest that pyridoxine is the important therapeutic anti-seborrhœic factor in injections of crude liver extract. They suggest use of vitamin B6 in daily doses of 25 to 100 mgm. Many of the British school advise alkalization of the urine.

4. A field of therapy as yet little explored is the use of suspensions or extracts of the causative organisms (notably *Pityrosporum ovale*) in an attempt to desensitize the patient.

Sufficient work has not yet been completed in this field to warrant further comment.

SUMMARY

1. Seborrhœa is considered a prerequisite to seborrhœic dermatitis.
2. Various endocrine, food and emotional factors predispose to seborrhœa.
3. Causative organisms of seborrhœic dermatitis are three in number, the most important being *Pityrosporum ovale*.
4. A probable allergic factor in etiology is stressed.
5. Clinical types, in the main those of Darier, are listed, and the dermo-histology is discussed.
6. Treatment stresses prophylaxis. Various types of local and general therapy are listed.
7. The idea of adjunct treatment by desensitization is suggested.

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RÉSUMÉ

Pas de dermatose séborrhéique sans séborrhée. L'excès de sécrétion de sébum paraît influencé par certains facteurs endocriniens, par l'alimentation et par les émotions. Trois micro-organismes peuvent causer la dermatite séborrhéique, mais de ceux-ci, il faut surtout retenir le *Pityrosporum ovale*. Par ailleurs on ne peut ignorer certains facteurs allergiques dans la pathogénie de cette dermatose. Les livres aspects cliniques de la maladie sont décrit et les tableaux histologiques sont résumés. Le traitement sera avant tout prophylactique. Plusieurs modes thérapeutiques locaux et généraux sont indiqués et l'on mentionne l'intérêt qu'il y a de tenter simultanément des essais de désensibilisation.

JEAN SAUCIER

It is the tradition of our calling that the poorest and humblest has just as great a claim on our services as the highest and most affluent. The measure of their need is the measure of our help. Thus it was that Sir Frederick Treves, when his Sovereign, King Edward VII, thanked him for his life-saving attentions, was able to reply with pride: "Sir, you have had as much care and skill in your illness as the humblest of your subjects". —Sir A. Webb-Johnston, *The Lancet*, p. 612, October 26, 1946.

SAFETY MEASURES IN THE PRACTICE OF ANÆSTHETICS*

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FIRE AND EXPLOSION HAZARDS

TERRIBLE and tragic explosions and fires have occurred in operating rooms due to the explosibility and inflammability of many of our most useful anæsthetic vapours and gases. This danger is always with us; and we anæsthetists must assume the rôle of fire prevention officers. Insistence upon intelligent common sense on the part of ourselves and everyone in the operating room is imperative. Striking matches or smoking in the presence of anæsthetic mixtures or oxygen is entirely inexcusable—even in a ward, if oxygen is there.

"Static" sparks (more common in a dry atmosphere) form probably the greatest hazard. For this reason wool and silk articles of clothing or blankets *must not* be allowed to cross the threshold of the operating section. Furthermore the constant use of a Horton intercoupler¹ is practically a "must" for the equalization of static electro-potential in the patient, operating table, gas machine, anæsthetist, and anæsthetist's stool, thus minimizing the likelihood of "static" sparks in the region where they would be dangerous.

The use of the electro-cautery, dissecting currents and coagulating currents by the surgeon must have the immediate approval of the anæsthetist in each case. He alone knows whether there is any possibility of there being a flash-point concentration of his anæsthetic vapour or gas at the site of the employment of these cauteries or currents.

Every electric switch and each electric outlet fixture should bear a warning sign to orderlies and nurses, worded somewhat like this: "Caution—Ask Anæsthetist First". And we must see to it that the caution is respected. This in itself goes a long way toward keeping everyone concerned alert to the routine of fire and explosion prevention. Fire fighting apparatus must be adequate, ready at hand and periodically inspected. All regular operating

room personnel must be kept fire-minded and drilled in both preventive and combative measures.

Regina winters are notorious for low humidity. Nevertheless, in twenty years of anæsthetics practice I have never seen an anæsthetic fire or explosion. Common sense is the greatest safe-guard. But possibly some one or more of us here today may experience, during future practice of anæsthetics, an unfortunate anæsthetic explosion or fire which may be difficult or impossible of explanation (as has been frequently the case in past misfortunes). In such an event we would be in a very weak position in the eyes of the patient's relatives and perhaps also in the eyes of the courts, if we could not firmly establish that we practise continuously and conscientiously every reasonable method of fire prevention and safety. This means simply that our discipline must be consistently high, and our methods and apparatus all in excellent order.

SAFETY MEASURES DURING THE OPERATION

A. Regionals and spinals.—Characteristic of all our presently available local analgesic drugs is that an individual overdose produces clonic muscle spasms and possibly full-blown generalized convulsions. And we must remember that a few individuals may have an unexpected hypersensitivity to any one or more of these agents; thus an average dosage may prove individually dangerous or even fatal. One may expect these twitchings to commence first in the hands or face. If twitchings occur, act at once. An intravenous barbiturate, sufficient to relax the muscles, is considered the best antidote, and may promptly allay the convulsions before the respiratory and heart muscles become affected. Pentothal sodium given intravenously in 2½ or 5% solution in generous anæsthetic dosage, is considered effective; and this drug is probably the barbiturate closest at hand and best understood. Possibly intravenous curare (intocostrin) may prove to be an even more effective antispasmodic. I would not hesitate to try it if a barbiturate seemed ineffective. Needless to say, further injection of the offending local analgesic drug must not be made. In fact every suitable effort should be made to remove what has already been administered, or to retard its rate of permeation into the general circulation. Rapid removal of injected tonsils or tumours; a con-

* Read at the Seventy-seventh Annual Meeting of the Canadian Medical Association, Section of Anæsthesia, Banff, Alberta, June 13, 1946.

stricter band about the arm above an injected hand, etc., are examples of what is meant.

Injection of local anæsthetic drugs even in reasonable dosages, particularly intrathecal injections, may produce a marked, sometimes dangerous, fall in arterial blood pressure. In spinal analgesia this effect is the rule rather than the exception. I have seen more than a few serious secondary hæmorrhages (one of which ended fatally) following surgery, particularly prostatic surgery, performed under spinal analgesia. The explanation is simply that in each instance the anæsthetist carelessly or ignorantly allowed the surgeon to operate in a field that was relatively bloodless due to very low blood pressure induced by his spinal block. Thus, when subsequently the blood pressure regained normal levels, open blood vessels, unobserved by the surgeon during the operation, began to hæmorrhage freely.

In our hospital we now observe the strict rule that no spinal anæsthetic is ever given without frequent blood pressure readings and recordings, or without a vasopressor drug with syringe at hand in order that blood pressure will be maintained within reasonably normal levels throughout the operation. In other words, we practice blood pressure control, after a fashion. We are at present seeking a safe and smoother method of control than we now practise, and I feel we will soon have a good system, using perhaps a very dilute solution of neo-synephrine or methedrine for intravenous administration. We are deliberately avoiding adrenalin because of its reputed danger in association with cyclopropane. We are very fond of cyclopropane and like to feel that we are left free to add it to a spinal or local anæsthetic whenever we may wish.

Our present crude method of combating low blood pressure is to inject 1, 1½, or at most 2 minims of standard neo-synephrine intravenously. Within a minute or two this dose will boost systolic blood pressure from 80 to 160 mm. Hg. with the greatest of ease. The rise is strikingly spectacular in its promptness and degree. Sometimes it is dangerously high for a few minutes. If so, inhalations of a cracked ampoule of amyl nitrite, or a hypodermic injection of nitroglycerine gr. 1/100, will perhaps modify the apex of the rise. This powerful concentration of neo-synephrine is not entirely satisfactory because minute quantities of this vasopressor drug given intravenously

produce only a temporary effect, and may have to be repeated in ten or fifteen minutes. Hence there may ensue a worrisome effect on blood pressure levels. A slow continuous intravenous drip of a very weak solution of neo-synephrine in normal saline would seem much more promising. We are only waiting for some capable physiologist or pharmacologist to suggest the optimum strength, vehicle and rate of injection.

I must not pass this particular subject without paying a tribute to Dr. Frankis Evans,² of London, England, who, at St. Mark's Hospital gave me such an impressive demonstration of "controlled blood pressure". My present concept of the subject is based upon his observations.

B. Intravenous general anæsthesia.—We need only consider pentothal sodium since it is at present the most widely acclaimed and most widely used member of the intravenous barbiturate family. Intravenous pentothal was first employed satisfactorily in a 10% solution. Later, upon good advice arising from the Anæsthetics Department of the Mayo Clinic, its concentration for administration was everywhere reduced to 5%. The strength now recommended is 2½% for ordinary methods of use, and I have seen it used with satisfaction in 0.3% concentration for the continuous intravenous drip technique. From the standpoint of pentothal safety, one might broadly state simply, "the weaker, the safer".

Permit me to state a few rather specific "Don'ts" (and "Do's") for pentothal safety.

1. *Don't* over-premedicate. The barbiturates are notorious respiratory depressants. Pentothal is particularly guilty in this respect. Hence, avoid barbiturates in the premedication. Pantopon gr. 1/6 with hyoscine gr. 1/200 for adults is generally an optimum dosage.

2. *Don't* expect or demand full relaxing anæsthesia from pentothal. It is *not* as safe an agent for deep anæsthesia as most of our common agents. Dr. Ralph Knight of the University of Minnesota³ who has had early and broad experience with pentothal rather startled many of us recently by stating in effect:

"Pentothal gives such a beautiful induction of sleep from the patient's standpoint, that, if suitable veins are available, I do not see why we use any other agent for the induction of sleep in general anæsthesia. On the other hand, I see no reason why we should attempt to use it for anything further, because it is such a relatively dangerous and inferior anæsthetic agent."

This is certainly food for thought, particularly for most of us who saw war anæsthesia abroad

in the recent conflict. For example, I clearly recall asking our hospital anæsthetist for a report after we had been a few weeks in Sicily; and that his breakdown of 416 general anæsthetic administrations was simply: 16 ethers, and 400 pentothals. But we must recall that we were scaled down to war equipment, having no gas anæsthesia apparatus; and also the fact that most of our wound cases did not require relaxing depths of anæsthesia. Thus, in well equipped hospitals here at home, perhaps Dr. Knight's dictum concerning pentothal employment is justifiable.

3. *Don't* allow any part of a pentothal injection to be deposited peri-vascularly or intra-arterially. Solutions of this drug in ordinary concentrations cause a very extreme (often irreversible) arteriospasm when injected either into or around an artery. Many cases of gangrene of the fingers or hand, resulting sometimes in amputation as high as the elbow, have been reported due to this misadventure.

The following precautions are recommended:

(a) Avoid, so far as is practical, the use of veins in the antecubital area, where arteries may easily be entered in error. (b) Always pause after the first few minims have been injected; look for peri-vascular swelling at the needle point; and ask the patient if he has any pain in the hand or fingers. (c) Keep the hand (or foot) beyond the point of injection fully exposed and in good light. Look repeatedly for blanching of the fingers (or toes). (d) When swelling occurs around the needle point, (indicating peri-venous infiltration) it has been recommended that the site be abandoned at once, and that prompt injection be given of approximately an equal volume of 1% procaine HCl (novocaine) into the infiltration. By this means it is hoped that vaso-pressor sympathetic nerve fibres may be blocked; thus overcoming the threatened arteriospasm and local tissue ischæmia which might end in a nasty sloughing ulceration. If a peri-vascular infiltration should attain considerable size, multiple incisions with evacuation and drainage are advisable; this to be undertaken as soon as the patient is anæsthetized. (e) If blanching of a pertinent skin area should occur, many suggestions for first aid have been advanced; but no specific immediate therapeutic measure has been established to my knowledge. Among the measures advocated are: copious peri-arterial injection of 1% procaine HCl in the region of the original pentothal injection; repeated injectional blocking of the brachial plexus on same side; subsequent blocking of the stellate ganglion; loose absorbent cotton-wool and heat to the affected member, in a dependent position; use of a vasculator; and even heparin anti-coagulant treatment.

I fortunately have had no first-hand experience from which to judge the value of treatment measures in such a mishap.

4. *Don't* commence a pentothal administration without making sure that all your safety devices are right beside you. These include: (a) A suitable airway. I like to see any one of our interns with a naso-pharyngeal airway

pinned on his chest, and a rubber Waters-Guedel oro-pharyngeal airway in his pocket when he approaches a patient, bearing a syringe of pentothal solution in his hand. The patient under pentothal *needs* an artificial airway. The nasal type is better, and is tolerated under lighter levels of anæsthesia; also it is suitable for dental extractions and similar surgery if the added precaution is taken of placing a handful of loose gauze in the back of the mouth and oropharynx. (b) An oxygen apparatus. Usually it is one of the many types of gas machines which is employed for this purpose. But some type of apparatus which can be used to give manually propelled (bag pressure) artificial respiration with oxygen should *always* be at hand. It may not be required once in several thousand cases, but if it is needed it *must* be right beside you. Hence it must *always* be beside you. (c) Since pentothal anæsthesia is general anæsthesia, most of my remarks under the heading "Inhalation anæsthesia" will apply to pentothal anæsthesia, and need not be twice mentioned.

C. *Inhalation anæsthesia*.—Airways have already been mentioned briefly in connection with pentothal anæsthesia. But let me say that every patient under general anæsthesia deserves an artificial airway. Airways should be atraumatic, made of rubber; they should have a generous lumen; and they should be long enough to extend well beyond the base of the tongue. Both oral (Waters-Guedel) and nasal (Magill) types, in various sizes should be in plenteous supply in every operating room. I often find it advantageous to use both an oral and a nasal airway at the same time. When inserting either the oral or the nasal airway, the tongue should be pulled fully forward, using a tongue forceps, so that the lower open end positively rests beyond the base of the tongue, which it then supports. I much prefer a light Allis forceps for tongue retraction; and, incidentally, after once being used on a patient it is clipped to his gown or head-wrap where it remains handy until he has regained full reflex activity. Such forceps have a string tied to one handle as an indication that they should be returned from wards to the operating room daily.

Both oral and nasal airways should be generously lubricated before insertion. Ordinary vaseline is quite suitable. The nasal tube has the distinct advantage that it is tolerated under

a much lighter plane of anæsthesia than the oral type. This applies both in induction and in recovery. In the case of an edentulous patient, however, there is little, if any, advantage.

Endotracheal intubation is a procedure that every anæsthetist must master. To the unskilled, I recommend the autopsy room as offering splendid facilities for learning the laryngoscopic appearance and positions of the landmarks in the mouth, pharynx, and larynx. Then I advise practising on edentulous etherized patients during recovery, after the operation is completed. Later try patients with good teeth during recovery. Aim to make yourself a master of the direct laryngoscope, and fully able to intubate even under the most unfavourable conditions. You will not practise anæsthesia long before you will thus have saved a life or two; and you will be able to enjoy the advantages which such a method of anæsthesia certainly offers in many operative procedures.

I would advise that we all be possessed of both the straight blade type (in two or three sizes, *e.g.*, the Guedel) and the curved type (Macintosh) of self-illuminating, direct laryngoscopes. Each has its advantages. Both should be ready.

As regards intratracheal tubes for anæsthesia, the following observations obtain:

(a) The tube should be pliable but not easily collapsible and should have an open bevelled end. (b) It should always be generously lubricated (vaselined) before insertion. (c) The tube selected for any patient should have the greatest diameter (largest lumen) which will pass freely through the glottis. (d) A thin rubber inflatable cuff (Waters) near the lower end of the catheter will ensure air-tightness, and will prevent the aspiration of foreign matter into the trachea. Packing the pharynx around the intratracheal tube has a similar, though less positive effect. (e) In orotracheal intubation, a soft metal (copper wire) introducing stylet, curved anteriorly in its distal inch or two inches, adds very definitely to ease of control.

Two distinct types of endotracheal catheters are in general use: the semi-rigid catheter, for direct orotracheal intubation; and the curved rubber (Magill) catheter which is suitable for both nasotracheal and orotracheal intubation. Both types have their places in anæsthetics practice, but because we are here considering safety factors only, I urge that we all master the technique of quickly introducing directly, via the mouth, a semi-rigid, good-sized, catheter; and be able, on urgent demand, to coax or tease it through even a glottis which is in tense spasm, or through and beyond a collapsed portion of the trachea. Such a manœuvre has been undoubtedly life-saving at least seven

times in my personal experience. And it may be demanded again at any time.

Intravenous fluids.—(a) Whole blood transfusion should be anticipated and made ready for long operations where wide tissue dissections are necessary, and in cases wherein blood loss may be a serious danger. For example, it is good practice to administer blood routinely in stomach or bowel resections, and particularly in abdomino-perineal sections. Radical mastectomy is another good example. Since we anæsthetists are becoming more and more blood transfusionists, we have been warned that, except in dire emergency, we must pay heed to the Rh factor of both the donor's and the recipient's bloods.

(b) Blood plasma, either dried or in solution, should be constantly on hand both as an emergency substitute for blood from a safety standpoint, as well as for the advantages it may have in certain conditions: for example, in shock it may overcome hæmoconcentration; in extensive surface burns it may replace lost blood proteins; and in highly concentrated form it may combat lung œdema.

(c) Normal saline-dextrose solutions for intravenous administration must be in generous supply and ready for immediate use. They can be used in emergency to replace temporarily a blood volume loss in unexpected hæmorrhage. But perhaps their greatest usefulness is in forestalling the severe collapse in blood pressure, which typically accompanies many shock-producing surgical procedures, or which so often occurs after prolonged surgery and anæsthesia. I believe intravenous saline-dextrose should be given in the case of every operation which will probably last, or has lasted, beyond forty-five minutes in time; as well as for certain shorter procedures which are generally recognized as shock-producing. For long or serious operations, I am sure the happiest anæsthetist is the one who has an intravenous drip running, and his patient intubated. He is then certainly in a very masterful position.

Vasopressor drugs have already been briefly mentioned in connection with spinal analgesia. And therefore permit me only to state here briefly some of my impressions concerning pressor drugs.

Their use by hypodermic or intramuscular injection is very unpredictable and seems unscientific. I advocate their use by the intravenous route only. They should be considered

only as a whip to a failing blood pressure. Each time they are repeated, the effect becomes lessened. Their effects are very fleeting. Hence we must not depend upon them alone, but must take prompt steps to improve a falling blood pressure by increasing blood volume by the intravenous administration of one of the fluids before mentioned. We have been warned that epinephrine and ephedrine in association with cyclopropane may produce a fibrillation which can be fatal. Perhaps, therefore, those of us who are fond of cyclopropane should restrict ourselves in the use of pressor drugs to neo-synephrine and methedrine. We must be cautious when administering pressor drugs intravenously to avoid producing a dangerously high temporary blood pressure, especially in aged and arteriosclerotic patients. Hence in case our caution is not always adequate, we should have amyl nitrite and nitroglycerine close at hand.

Curare.—I cannot resist the urge to place curare (Intocostrin, Squibb) among the safety agents of the modern anæsthetist's armamentarium. Thanks to Harold Griffith⁴ we now have for anæsthetists a relatively safe agent which will produce within two minutes complete muscular relaxation for a short period, and which can be safely repeated. So now we can enjoy lighter levels of anæsthesia, or the use of less potent agents, and yet when the surgeon needs complete, utter relaxation, we can give it to him promptly. This must be considered safer and more expedient than forcing a difficult, resistant patient with dangerous agents into dangerous depths of anæsthesia. I have been thrilled repeatedly by the spectacular and dependable effects of this drug; and thus far thrilled also by the prompt and apparently complete disappearance of its effects. Just the same I never use it without having a free airway and an oxygen bag-pressure apparatus connected up; nor without an ampoule of prostigmine ready for intravenous injection in case I should ever feel I might need a specific antidote (2 c.c. ampoule prostigmine 1:2,000; intravenous dose 1 to 2 c.c.).

From the standpoint of safety, it should also be stated that the troublesome, and sometimes serious, phenomenon of incomplete laryngospasm, causing respiratory embarrassment, can be temporarily overcome by the usual or somewhat modified doses of curare.

Curare in effective relaxing doses (for adults 50 to 80 mgm., i.e., 2.5 to 4 c.c. of intocostrin) will cause complete abdominal relaxation and "quiet" for 15 or 20 minutes, and rarely with any important respiratory embarrassment. An individual overdose will produce complete paralysis of the intercostal muscles (corresponding to 4th plane of 3rd stage of general anæsthesia); and it may go further to induce complete muscular paralysis of the diaphragm resulting in cessation of all respiratory movements. In such an event proper manual artificial respiration via the breathing bag will keep the patient's general condition in *status quo* until the curare effect begins to wear off and active respirations return. We are warned to greatly reduce our curare dosage where ether is being administered. It seems that ether itself has to a certain degree a curare-like effect upon the efferent neuro-muscular junctions. Thus complete paresis of all respiratory muscles would be produced by relatively small amounts of curare.

Suction as a safety measure to the anæsthetist has a value which can scarcely be over-estimated. Suction is a must in every operating room. The anæsthetist, during general anæsthesia, should have beside him both a mouth suction handle and a lubricated small rubber catheter with connector. The former is used regularly to keep the mouth and pharynx clear of any material which might enter the trachea, and the latter is used to clear the lumen of airways and endotracheal tubes, and also to perform a "toilet" of the lower trachea and main lower bronchi, both whenever coarse rhonchi are heard, and at the close of every endotracheally administered anæsthetic, preferably just as the tube is to be removed. To avoid too forceful suction, which might easily injure the mucosa at the tip of the catheter, a simple mercury safety valve can be installed to limit the negative pressure to the desired level.

D. Respiratory inadequacy and respiratory arrest.—Until only a few years ago failing respiration under anæsthesia was dealt with simply by the withdrawal of the anæsthetic agent; and respiratory arrest called for the surgeon to drop his instruments and undertake artificial respiration by rhythmic chest compression, while the anæsthetist administered, or

shouted for, hypodermic injections of camphor-in-oil, strychnine, or caffeine—perhaps all three.

Today we feel that unduly shallow or slow respirations usually need only the mechanical augmentation which can be easily supplied by rhythmic pressure on the breathing bag if the airway is clear. For example, the patient in the fourth plane of third stage anæsthesia actually requires the assistance of about two good full lung expansions every minute, and can thus be carried along smoothly and with relative safety for a considerable period. And the patient who has a good pulse, but whose respiratory movements, either by accident or by design, have ceased entirely is now recognized as being in fourth stage anæsthesia, and he can be adequately supported while in this deep stage by the simple method called suitably by Guedel "controlled respiration".⁵

E. Cardiac arrest.—While failing circulation has been dealt with already, actual cardiac arrest is quite a different matter and is usually irreversible. Guedel⁶ says, "Death is due to complete cardiac anoxia". Macintosh⁷ says, "Animal experiments suggest that after a cessation of beating there is increased irritability and conductivity of the heart, lasting about 1½ minutes". No doubt irritability must then diminish and completely disappear very rapidly.

The generally advocated emergency measures are:

(1) Steep Trendelenburg position. (2) Full rhythmic inflation of the lungs with oxygen, supplemented by manual chest compression for deflation. This mechanism in itself will keep up a certain amount of blood flow through the lungs and heart, and perhaps also through the coronary vessels. (3) Cardiac puncture. Using a hollow needle, the heart muscle is punctured, preferably the auricle. The puncture itself may provide the stimulus necessary to instigate muscle contractions, usually at first fibrillating in character. At any rate, the needle is withdrawn. (4) Cardiac massage by the surgeon through an upper abdominal incision may succeed in keeping the coronary circulation in motion. (5) Injection into the cavity of the left ventricle of 5 to 10 minims of adrenaline (1:1,000), or other similar drug, may succeed, via the coronary circulation, in stimulating the heart muscle.

We should remember that anoxia of brain tissue lasting more than a very few minutes (some say 8 minutes maximum) produces an irreversible cell degeneration. Therefore in the mishap of cardiac arrest we must institute any or all of the above measures immediately. We must have ready a suitable needle for cardiac

puncture sterilized and kept in a sealed test tube.

POST-ANÆSTHESIA CARE

A. On the table.—The anæsthetist should take steps to revive the patient as far as he can. He should suction out the mouth thoroughly, and also the trachea if indicated. He should ensure that no state of depression or collapse exists which he can promptly combat. He should leave a suitable artificial airway *in situ* as long as the patient will tolerate it. An Allis forceps, a "kidney" basin, a towel and gauze sponges should be placed beside the patient's face. The continuous intravenous drip apparatus, if being used, should be checked and made ready for moving the patient, splinting the arm, etc. If the patient has been requiring oxygen, then a suitable oxygen apparatus for transport should be set up. He should then write any special orders to be carried out at once on return to the ward.

Finally, when he is assured that the patient is in good condition to be moved, he should go through a formal hand-over of the responsibility for the patient to the transport nurse. He should make sure that she understands how to "hold a jaw", use a tongue forceps, watch breathing, etc. And he should pass to her his written instructions, if any, for immediate ward care. Then in the ward the transport nurse goes through a similar formal transfer of responsibility and instructions to the ward nurse.

What I fear most in the busy practice of anæsthetics is that period, which can be so dangerous, between the time the anæsthetist last sees the patient in the operating room, and the first arrival of a house doctor in the patient's ward to carry out whatever is ordered or what he considers is indicated. We as anæsthetists must do all in our power to anticipate and bridge over this dangerous hiatus. Certainly a recovery section is the very best answer.

B. During recovery on the ward.—The unconscious or semi-unconscious post-anæsthesia patient positively requires the constant, undivided attention of a trained or student nurse, who must be in a position to summon immediate additional help at any moment. Until the return of the patient's reflexes and consciousness, such nurses must carefully watch and record

at frequent intervals, particularly the following: respirations, pulse, colour, vomiting and blood pressure. Incidentally, we will do the public a great disservice if we persist in the old prejudice that one must be a fully qualified physician to use a sphygmomanometer. She must supervise the intravenous drip of fluid or blood, and she must set up and control oxygen therapy, if ordered or indicated.

Nurses who might be assigned such duties must be well trained in practical and effective artificial respiration which can be carried out in bed and in the dorsal decubitus. The day may come when they will use it most urgently. I have never been able to please a nurse half so much as when I recently had occasion to tell one that she had done a grand job of artificial respiration and had undoubtedly saved a woman's life.

Ward interns must be impressed with their important responsibility in frequently visiting postoperative patients, particularly during recovery from anaesthesia.

GENERAL CONCLUSIONS

I feel that frequent promptings are needed to keep us anaesthetists acutely alert to all the safety measures, practices, and routines which should properly concern us.

One good way of keeping this subject freshly before us is to include in our annual anaesthetics teaching of student nurses one lecture on safety.

The interests and responsibilities of the modern anaesthetist place him in an important and respected position among his confrères. He is primarily, of course, an anaesthetics expert; he is likely the recognized hospital pneumatologist and perhaps the blood transfusion supervisor; he may be considered the hospital physiologist, and is often an important research worker. But apart from any of these, he should be safety adviser to the staff and hospital, and also a constant, co-operative, active consultant on the surgical team throughout the hospitalization of every "anaesthetics" patient.

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INDUSTRIAL HEALTH PROBLEMS ENCOUNTERED IN THE WAR*

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RECENT experience emphasizes that with the incentive of war, the productive capacity of the individual is realized in terms of physical and mental health. The British Munition Workers Committee in World War I demonstrated that sickness and accidents rose and output fell with unfavourable conditions of work, particularly with excessive hours of labour. In 250,000 workers Gafafer,¹ United States Public Health Service, found for sickness of over eight days' duration in 1942, a male case rate of 106.1 per thousand workers exposed, 16% greater than the average from 1933 to 1942 and the highest of any year. The female rate was 168.4 for all causes and 14% in excess of the average. Among the increases were for males, pneumonia 83%, bronchitis 44%, diarrhoea and enteritis 38%, and for females, diseases of the organs of locomotion except joints 85%, pneumonia 81%, and neurasthenia 41%. Many other studies testify to the rise in sickness rates in wartime. Deteriorating and compensatory influences obviously extend beyond the factory.

In a British study of certified sickness² covering 20,000 women in industry there was a total sickness absence of 7.8% of total time, at least double the peace time rate. Married women suffered 48% more cases of sickness and 65% more lost time than single women. This was common to all ages but was highest in the age group 20 to 30 and applied to accidents as well, whether at home or at work. This experience was considered to be related to fatigue associated with work at the factory and at home, difficulties in transportation and other surrounding conditions. There is no suggestion that the married women were of inferior physique. Nervous disorders were second to respiratory conditions, being directly responsible for 17.5% of total sickness absence, instead of the usual 6 to 10%.

ACCIDENTS

It has been established that accident frequency is influenced by such environmental con-

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ditions as atmospheric temperature, lighting and speed of operation. About 75% of accidents whether in the factory, at home or on the road are sustained by 25% of the exposed population and in this group are those designated as accident prone, estimated at 4% by the Connecticut Bureau of Vehicles. Their record does not improve with age. They are repeaters who should be employed in less hazardous work. They are not necessarily less efficient in other directions. Some progress is being made in the development of tests for recognizing them among applicants for employment. Tests even for defects in the special senses, *e.g.* lack of depth perception, are not widely applied. Young workers first entering industry suffer high accident rates. The report of the British Factory Medical Inspector in 1937 pointed out that boys and girls under 18 years of age in a group of 65 factories, in the first six months of employment sustained accidents to the extent of 50% of the group; in the second six months 23% were affected and after two years employment only 3%. Workers not used to factory life or changing from one job to another showed only a temporary increase in accidents. Both groups contributed to the temporary rise in accident experience in the war.

Up to 1943 in the United States in manufacturing industry there was an overall increase in the average of disabling injuries per million hours worked from 19.1 to 21.³ The increase in Ontario was roughly comparable. Since then the trend has been down. In Great Britain the rate rose for men over 18 years of age from 37 per thousand in 1939 to 53 in 1943 with a decline thereafter.

There is a positive correlation between lost time from minor and major accidents and between cases of minor accident and sickness.⁴ It is shown that those with more accidents are more likely to report with sickness also. Gross physical defect is not rated as a major cause of accident (3 to 6%) except where the special senses are involved but collaboration between the medical and safety departments of the individual plant is necessary to bring about more studies of accident experience with an epidemiological approach.

PERSONAL HEALTH

The sudden influx of new workers to industry required also the simplification of process, so far as this could be carried out. Just before

the war, Turner⁵ found more sickness in women on repetitive conveyor work compared with those doing the same job on individual machines, and considered that this was due to the fixed pace rather than to speed of operation. He recommended some selection of workers to reduce monotony.

The employment of handicapped persons was mainly satisfactory. Fulton⁶ reports from careful recording that while compensable injuries were increased, complaints of ill-health at the factory dispensary and total sickness absence were not increased in this group. It was rather among those who constitute a problem for the personnel and safety departments as well as for the medical department, representing in his case around 30% of the plant population, that the accidents, sickness and poor efficiency at work occurred.

These considerations have done much to focus the attention of employers on suitable placement at work and introduction to the job, emphasizing what the handicapped worker can do rather than the jobs from which he should be excluded. The war veteran is benefiting from this approach.

Mass administration of "cold" vaccines and of vitamin preparations were the subject of frequent inquiry from industry, in recognition of the loss of production from ill health. The American Medical Association, through its Council on Industrial Health, issued statements advising against their uncontrolled use in industry.^{7, 8}

Overcrowding was present in some industries. Its influence may have been reflected in upper respiratory infections but not in the adult tuberculosis death rate in Canada which in 1939 was 43.7 and in 1944 was 39.3 per one hundred thousand. This is more remarkable when it is recalled that the industrial population sustains a large proportion of middle-aged tuberculosis and that in Great Britain in the last war this death rate in women fifteen to twenty-four years of age was doubled. The death rate for tuberculosis in Germany doubled between 1939 and 1942.

During the war much reliance has been placed on the "current" supervision of health which an industrial medical service can give. Many who would not have been employed except for the war could not have continued at work at all without this supervision. At the beginning of 1943 the National Health Survey⁹ showed that

about one-third of employees in manufacturing industry in Canada were receiving some degree of health supervision by plant physicians. This was directed to suitable placement at work, receiving complaints of ill-health, correcting conditions of work, assisting in the rehabilitation of sick and injured employees, caring for accidents and providing information on health, but usually excluding the medical care of sick persons, who were referred to the family physician. This service was too largely confined to large war factories, partly for lack of personnel but mainly because the practice had not been widely accepted by employers in smaller factories. There is evidence of increasing interest in this group. This interest needs to be stimulated.

OCCUPATIONAL DISEASES

Engineering control of occupational hazards including methods for determining the degree of exposure of workmen constantly improves. To fix the maximum allowable exposure to any substance under industrial conditions involves extensive toxicity experiments. The engineer undertakes, through the control of dust and fumes, to meet these standards where they exist but safety demands in addition that the physician be enabled to detect early indications of poisoning before disability ensues due to mechanical failure of other preventive measures. Permissible levels for concentrations of substances like lead and arsenic in blood and urine have been worked out and used in control. Some investigators prefer to rely rather upon early evidence of biological changes due to industrial exposures, for example, the presence of basophilic stippling of red blood cells due to lead or the direct indican reaction in urine of those with T.N.T. exposure. Much work remains to be done on this aspect of the control of occupational diseases, and from this standpoint reference will be made to some of the substances encountered during the war as they affect the hæmopoietic, hepatic, and respiratory systems.

Hæmopoietic system.—Exposure to radium emanation and to fine dust particles from radioactive paints used for instrument dials was closely supervised. A set of instructions and frequent inspection instituted early in the war emphasized local ventilation, protective clothing, a clean work place and disposal of waste, limitation of the amount of paint available for use at one time, good washing facilities, the use of the

ultra-violet lamp to detect contamination of the skin or clothing, physical examination including blood smears every three months, as well as the use of the Geiger-Mueller counter for evidence of storage in the tissue. Latterly, breath testing for alpha radiation has been carried out. On analysis of the reports of examinations of workers, conducted by plant physicians there appeared a few instances of employees with a temporary slight leukopenia with no significant alteration in the differential count. These white cell counts returned to normal shortly except in two or three instances where return to normal was delayed. In an occasional single examination the lymphocyte count was higher without a leukopenia. In one instance the lymphocyte-leucocyte ratio was sustained at about 50-50 and the breath test was within normal limits. In three cases this ratio was about 50-50 on application for employment. Browning¹⁰ refers to the presence of a leukopenia with a relative lymphocytosis in dial painters, which is interpreted as being the result of an initial stimulation of the reticulo-endothelial system and not considered to be associated with the damage to bone marrow characteristic of the late effects of storage of radioactive materials. In some exposures even a reversal of the leucocyte-lymphocyte ratio was observed. Its value for the supervision of exposed workers requires further assessment.

The use of benzol increased, *e.g.*, in lining bullet-proof gasoline tanks with rubber, because toluol was required for the manufacture of trinitrotoluene. Later, compounds of petroleum origin were used for this purpose. Regular examination noting a leucopenia with relative lymphocytosis as an early indication for reducing exposure has been valuable here in the control of this hazard, even though Goldwater¹¹ reports a controlled study of workmen exposed, in which this finding was uncommon. He cites the most frequent early abnormalities as anæmia, macrocytosis and thrombocytopenia. Benzol produces an aplastic anæmia. The bone marrow may be aplastic or hyperplastic.

Browning¹⁰ reported in a group of workers exposed to pure xylol 54.5% with some leucopenia and 38% with a relative lymphocytosis.

Dioxan or diethylene oxide used as a solvent for resins, oils and waxes presents no change in hæmoglobin or red cell count but an increase in polymorphonuclear leucocytes with small

continued exposure, and liver necrosis with deaths from uræmia under heavy exposure.¹²

Hepatic system.—As far as is known there was one death in Canada from toxic jaundice due to trinitrotoluene and one from aplastic anæmia probably due to this substance. In fact, these seem to be the only two deaths from the manufacture of war chemicals and explosives and from shell filling. McConnell and Flinn¹³ have just reported on twenty-two deaths from T.N.T. in the United States in this war. Eight of these had jaundice and marked liver necrosis; 13 had aplastic anæmia and one presented evidence of both conditions. These cases may be compared with 475 deaths in 7½ months in the United States in the first World War. The authors remark that the pathological changes in the fatal cases of aplastic anæmia appear to be separate and independent of toxic jaundice. Liver destruction may or may not be present. In two deaths in seven cases reported by Evans,¹⁴ one showing subacute liver necrosis had recovered from jaundice but died with a blood picture of aplastic anæmia and hyperplastic bone marrow, while the other with acute liver necrosis had jaundice, a nearly normal blood picture, and hyperplastic bone marrow.

The Chief Inspector of Factories in Great Britain¹⁵ reported that in 1944 there were due to trinitrotoluene, 36 cases with cyanosis and dyspnoea, 11 cases of toxic jaundice, one of whom died and six cases of toxic anæmia, five of whom died. Stewart *et al.*¹⁶ early in exposure found hæmoglobin and red cell counts reduced and the reticulocyte count increased, more particularly soon after exposure ceased. They suggested that the sedimentation rate, the reticulocyte count and the direct indican reaction in urine be further investigated for use in the control of the hazard from trinitrotoluene. Alison Hamilton¹⁷ observed a rise in the large mononuclear leucocyte count in those exposed to T.N.T. before illness ensued and suggested its use to differentiate gastric symptoms due to this substance from those due to other causes among workers removed from exposure. It is not a specific response and has been noted in those exposed to aniline, benzene, and tetrachlorethane.

As liver poisons, the chlorinated hydrocarbons are important. Those with higher chlorine content which are solid at room temperature, when heated or in solution produce

so-called chloracne, and are encountered in the insulation and stripping of cables and in making electrical condensers. The icteric index, direct van den Bergh and bromsulphophthalein tests indicate liver damage in hospitalized cases but the results of such tests in those still at work do not appear to have been reported. Greenburg¹⁸ suggests that those who develop chloracne should be removed from exposure as a precaution against liver damage. The action of this group does not seem to be characterized by significant changes in the blood picture at any stage, although again Browning reports a relative lymphocytosis of 45% or over with a leucopenia in 16 of 42 workmen exposed to carbon tetrachloride. In four of these there was a reversal of the leucocyte-lymphocyte ratio. Carbon tetrachloride is widely used as a solvent for grease and as a fire extinguisher. It produces liver and later kidney damage. There were a number of instances where small groups of men suffered daily from nausea and vomiting until this occupational cause was recognized and one case where anuria developed with recovery.

Trichlorethylene is one of the least toxic of the chlorinated hydrocarbons and is used as a metal degreaser. There were two groups of cases of narcosis without demonstrable after-effects when the manual control of degreasing tanks failed. The British Inspector reports delayed action of trichlorethylene, where some hours after heavy exposure, coma and death ensued. Minor changes in the blood picture have been reported with this exposure. There is evidence of liver damage with heavy doses in animals but it is considered to be much less toxic than carbon tetrachloride.

Tetrachlorethane which was a source of many cases of toxic jaundice and death in the last war does not appear to have been used in this war. In early exposure a rise in large mononuclear leucocytes and a total white cell count up to 15,000 per cubic millimetre of blood has been observed, as being useful for control of the hazard.¹⁹ The liver damage produced is the basis for the symptoms and signs in later stages.

What relation exists, if any, between the hæmopoietic effects of some of these substances and liver damage is not clear. Kitzmiller and Kehoe²⁰ consider that evidence of macrocytic anæmia warrants liver function inquiry since exposure may be producing gastric or liver disturbance to affect the erythrocytic maturation.

tion factor. Wintrobe states that a macrocytosis is not necessarily evidence of liver deficiency and that it may represent an attempt at regeneration. Such considerations must be left to others, but it should be emphasized that more widespread and detailed inquiry both in the laboratory and by industrial physicians into the earliest detectable changes, *e.g.*, in the blood picture of certain workers, is necessary if disability from these exposures is to be prevented. At present, the varied liver function tests do not readily lend themselves to routine application to large numbers of workers. Of course, the value of frequent clinical observation of those exposed, is still paramount.

The absence of any findings which may be looked upon as specific in an exposed group is well illustrated in the case of many of the solvents such as amyl or ethyl acetate or butyl alcohol where the effect of repeated exposure to concentrations of two hundred to one thousand parts per million in air is uncertain. Neal showed recently that with toluol inhaled in concentrations as low as two hundred parts per million there was muscle inco-ordination, which might be conducive to accidents. This type of exposure was a problem during the war in the spray-painting of large objects like aeroplanes where special ventilation with heated air was a very expensive undertaking, without any clear-cut indication for its necessity.

Respiratory system.—Certain gas exposures are associated with a delay of some hours in the onset of symptoms and signs, which may result in failure to recognize the occupational character of the illness unless specific enquiry is made about the patient's job. Nitration procedures in the manufacture of explosives produced only a few cases of pulmonary oedema and no deaths, partly because those known to be exposed on account of leaks or breaks in equipment were confined to bed for at least twenty-four hours as a routine procedure. Where signs and symptoms developed, oxygen was administered. The variation in susceptibility to this exposure seems to be very great. This may be related to the varying content of different oxides of nitrogen.

Cadmium oxide produces pulmonary oedema. It is encountered in welding cadmium-plated articles and in soldering where cadmium to some extent took the place of lead. There were employees with complaints of tightness in the chest and headache before adequate ventilation

was applied. Just before the war Bulmer²¹ reported two deaths and a number of cases where electroplated cadmium was removed from metal parts by heating in a furnace.

Exposure to silica dust increased in foundries because of the necessity for pouring molten metal more than once on a shift. Shaking out molds and reconditioning sand involve the production of dust. Because of the length of exposure required under most conditions to produce silicosis, the effect of this increased exposure will not be at once apparent. Quartz crystal grinding²² for electronic equipment is a newer source of this hazard. Conditions which may be confused with the x-ray manifestations of silicosis have been reported from time to time, *e.g.*, back pressure with a compensating heart, bronchopneumonia, fungus infection, nitrous fumes, iron dust in welders, miliary tuberculosis and infrequently bagassosis, byssinosis or sarcoidosis. It is important that a history of exposure to silica dust be verified and other considerations in differential diagnosis taken into account before the workman is told he has silicosis, if his efficiency is not to be impaired by unnecessary worry. Silicosis illustrates the situation where on examination detection of the earliest known specific sign of its presence comes too late to prevent disability, since most cases at this stage proceed to the development of clinical tuberculosis. Sufficient time has not elapsed to be able to assess the value of the inhalation of aluminum for the prevention of silicosis in humans.

Byssinosis was investigated in Great Britain by a Committee on Dust in Cardrooms in the cotton industry in 1932 and again in 1939. This chest condition appears in strippers and grinders exposed to cotton dust. There is sneezing, coughing, tightness in the chest, temperature of 101 to 103° F. for two or three days. The symptoms are aggravated on return to work after the week-end. With continued exposure dyspnoea develops associated with bronchitis and emphysema. There has been reported chest x-ray evidence of fibrosis sometimes miliary in distribution. Numerous x-rays taken locally have not revealed this condition. It was listed as a compensable disease in Great Britain in 1940 where there had been 20 years of exposure to cotton dust and total disability existed. Positive skin reactions have been

obtained in the British cases with a protein fraction of the cotton seed. Histamine has been isolated from cotton dust and is increased in the blood after absence for the week-end. Moulds do not appear to be a factor. In 1942, Neal²³ isolated a Gram-negative rod-shaped organism from stained cotton from the Southern States which produced an acute attack of bronchitis with fever of short duration but it is not known whether these conditions are identical or essentially occupational.

Bagassosis has its name from bagasse which is broken sugar cane after the sugar has been extracted. The material is fabricated for insulation purposes. The dust associated with opening bales is responsible for increasing dyspnoea, cyanosis, blood-stained sputum, some fever and persistent weakness, with a miliary nodulation in the x-ray, the lesion proceeding to resolution or fibrosis.²⁴ The condition has been attributed to fungus, silica or a sensitizer and has been reported in Great Britain and the United States.

Sarcoidosis with manifestations in the lung is of unknown origin although it may be related to tuberculosis. It is a granulomatous condition. The lungs and mediastinal glands as well as other organs may be affected. Chest x-ray presents miliary lesions or consolidation with enlarged hilum shadows. Gardner reports that the condition has been observed in some workers exposed to beryllium, but occurs without this exposure, and that the relationship with occupation, if any, has not been worked out.

Inadequate reporting of cases of suspected occupational diseases by physicians to the Department of Health as required in certain Provinces makes any statement as to the local incidence of this last group of diseases useless. Attention has been drawn to the presence of occupational poisoning by general practitioners where it was quite unsuspected by the employee or the Department of Health. More widespread reporting would make it possible to keep the profession informed of new substances encountered and of new uses for those already known.

MISCELLANEOUS EXPOSURES

Of the skin irritants, cutting oils and solvents were responsible for large numbers of cases of dermatitis, due to exposure of new workers, longer hours of exposure, and failure to use suitable methods for removing contaminating

material. Skin eruption from tetryl was frequent and in some workers sensitivity was encountered so that these were removed from exposure. Control of the material in air and on clothing and especially close supervision by plant medical personnel prevented much loss of time from work. Even this type of supervision was not sufficient to control dermatitis in those exposed to mercury fulminate where a large percentage were affected. There appears to be no mercury absorption in these cases but the actual degree of exposure to mercury is small. On the other hand, cases of mercury poisoning have arisen from the use of organic mercury compounds as disinfectant for seed grain, wood pulp and glue. Synthetic resins, particularly urea formaldehyde and phenol formaldehyde used in glue for plywood aircraft, are more irritating as dust on the moist skin or when heated. A chlorinated phenol compound introduced for water-proofing cloth was rapidly responsible for six severe cases of dermatitis, three of them hospitalized out of seventeen persons exposed. Many cases from prevalent exposures are severe. Zinc chromate as a pigment in lacquer and sodium chromate for anodizing aluminum alloy to make it pliable, have added to the cases of intractable skin eruption due to chromium compounds.

Fluorine in flux for aluminum welding and in casting of magnesium-aluminum alloy; methyl bromide as a refrigerant and fire extinguisher; beryllium in alloy with copper for precision instruments; magnesium refining, and machining the magnesium-aluminum alloy, developed largely during the war. Fluorine effects develop slowly and cases have not been reported from these sources. Machle and Largent²⁵ have shown that a relation exists between urinary excretion and body retention of fluorine and used spot urine samples from those exposed in magnesium founding to determine the degree of exposure. Cases and deaths were reported from methyl bromide. Refining beryllium produced dermatitis, then bronchitis and chemical pneumonitis in this order.²⁶ Rest in bed is important to prevent pulmonary oedema. Three cases of "gas" formation considered to be due to spicules of magnesium-aluminum alloy under the skin of lathe workers were confused with gas gangrene.²⁷

In furnace men employed in extraction of aluminum oxide from bauxite for abrasive purposes there has appeared in this country

a number of cases of lung fibrosis, frequently associated with pneumothorax, sometimes bilateral.²⁸ Reports from Germany in 1941, described what appears to be the same clinical condition in workmen exposed to finely divided aluminum oxide.²⁹ Work is proceeding to determine whether this condition is due to compounds of silicon or aluminum or to one of the many impurities present in bauxite in small amounts.

Recently removed from the secret list, reference is made to BAL (British Anti-Lewisite) in its relation to metal poisoning.³⁰ Apparently, the "pyruvate oxidase enzyme system" is affected by arsenic compounds producing a block in carbohydrate metabolism. It is pointed out that BAL has a greater affinity for arsenic than for the tissue cells so that not only is its use a preventive but to some extent its action is reversible. It represents a method of detoxifying but may be itself toxic. Used in the case of exposure to lewisite (mustard gas) when tissue damage has occurred without necrosis up to 30 minutes after exposure, the inflammation subsides. It has therefore been demonstrated that pathological changes can be produced, directly associated with interference in a cell enzyme system. The substance injected in animals prevents pulmonary lesions after the inhalation of lewisite, cadmium, and zinc fumes and prevents systemic effects of mercury. However, with cadmium compounds it forms substances which cause serious renal damage.³¹

INDUSTRY AND MEDICINE

During the war period the position of industrial medicine has been clarified and consolidated to a considerable degree. Industrial physicians may be part-time for one, or full-time for a group of small plants or for one large plant and most practising physicians have some contact with the wage-earning population. Integrated with other aspects of the maintenance of personnel in industry, medicine extends beyond the prevention or control of disease to a positive effort to apply all medical measures which will contribute to good physical and mental health and so to the well-being and satisfaction of the employee in his work. This presupposes relationships inside and outside the factory which in no way disturb the patient-physician relationship but rather supplement it and are capable of improving the public relations of the profession. The organization of medical services

in industry has advanced in respect to the suitable placement of handicapped persons during the war and since, in the detection and correction of maladjustment at work, in the more systematic control of occupational diseases and in the application of the efforts of official and voluntary health agencies, for example, in the discriminating use of mass chest x-ray surveys, Wassermann tests and general health information.

The Industrial Health Council of the American Medical Association has been very active throughout the war in the orientation of this work in the field of medicine. A Committee of the British Medical Association in 1943 reported on the subject and there have been issued two reports by the Royal College of Physicians,³² covering the scope of industrial medicine and its integration with general practice.

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RÉSUMÉ

Revue générale des divers problèmes sanitaires de l'industrie en temps de guerre. Appréciation statistique de la fréquence des accidents, de la santé individuelle des employés,—selon l'âge et le sexe, analyse des maladies dues au travail particulier des employés et causées par les divers contacts et les diverses inhalations de toxiques. Discussion de l'image hématologique et des radiographies. Aperçu sur les mesures prophylactiques. Clarification de la position de la médecine à l'égard de l'industrie et suggestions intéressantes à propos de l'amélioration du présent état de choses,—pourtant infiniment supérieur à celui de la première Grande Guerre. L'effort présent tend à intégrer la médecine industrielle dans la domaine de la médecine courante.

JEAN SAUCIER

CHRONIC PROBLEMS IN INDUSTRIAL SURGERY*

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INJURIES TO THE HAND

HAND injuries constitute one of the most frequent and most commonly disabling types of industrial injury. Couch¹ has admirably and adequately dealt with the general surgery of trauma to the hands. I shall mention only two of the most commonly disabling events that happen to a working man's hands: œdema and thermal burns.

After an injury, particularly a thermal burn, the hand always swells from reactionary œdema. As we all know quite well this swelling is caused by the presence in the tissues and joints of plasma which, ultimately—if not removed—acts as a “liquid glue”, rendering the joints of the fingers and hands immobile. By far the greatest number of cases of partial and permanent disability in workmen subjected to injuries of the hand are due to this one factor alone. The burned area heals, or is skin-grafted, or the fracture becomes knitted, but the permanent disability caused by the extravasated plasma remains.

In one year alone 3.75% of all industrial accidents in this province were due to thermal burns and, of these, 282 involved the hands; 547 or 44.7% involved the upper extremity. A great many are permanently disabled.

Probably the most important therapeutic principle in the treatment of thermal burns of the hands and forearms is early elevation to

promote gravitational drainage of œdema for the reasons described above. This principle has been emphasized many times in ward rounds and elsewhere by A. H. McIndoe.² The further treatment of burns of the hands, as for burns elsewhere, has been well summarized by Flemming³ in the following “clinical pegs”:

1. Decide whether the burn is light or severe. If in doubt treat as severe, rendering adequate and appropriate general treatment first.
2. Local treatment depends upon the nature of the burn and a consideration of outside factors such as nursing and transportation.
3. Prevent dehydration and ensure sleep.
4. After the initial dressings which followed the primary cleansing of the burns have been left in place for three to seven days, the use of saline baths is indicated.
5. Watch the diet and see that the patient has adequate intake of essential proteins.
6. Watch the hæmoglobin and keep a record on patient's chart; give whole blood transfusions when indicated.
7. Skin graft at the first prospect of success.

In passing, one would stress this last dictum as of especial application to industrial surgery in Canada.

INJURIES TO THE ELBOW

Under this head I will only briefly mention two common injuries of the elbow: epicondylitis and fracture of the head of the radius. In the former the persistence of symptoms usually defies all treatment, time being the only remedy available. The best treatment for the latter is early excision, as suggested by Watson-Jones.⁴

INJURIES TO THE SHOULDER

It is my intention to discuss only one type of shoulder injury, partial or complete tear of the “rotator cuff”. In this I have followed almost verbatim the opinions of Moseley⁵ whose recent monograph on *Shoulder Lesions* should be read by all who are doing industrial surgery.

Tear of the rotator cuff.—This term is applied to the musculotendinous envelope formed by the supraspinatus, infraspinatus and teres minor acting as external rotators by means of their insertion into the greater tuberosity of the humerus on the one side, and the subscapularis, an internal rotator inserted into the lesser tuberosity of the other.

Ruptures of the rotator cuff vary in degree from a tear of a few fibres to tears involving the full thickness of the complete cuff and capsule. The terms partial and complete

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rupture are used by Codman in relation to the supraspinatus tendon. Moseley restricts the term "complete" to tears involving the full thickness of the tendon and capsule. Partial ruptures are considered as lesions only of lesser degree. Ruptures, whether partial or complete, usually occur near the insertion of the tendons into the respective tuberosities of the humerus.

A tear of the rotator cuff seldom occurs before the fifth decade and usually in the sixth decade of life. Males are more frequently affected and more often on the right side. The typical clinical picture is that of a middle-aged patient who, after a lifting strain or a fall, feels a "snap" in his shoulder accompanied by severe pain and inability to abduct his arm. He may continue to work with restricted movement or he may quit. Six to twelve hours later the pain is most severe and he is unable to sleep that night without sedation.

Examination shows that the shoulder is held in adduction and slightly higher than the normal side. Any attempt at movement, particularly abduction, causes acute pain and muscular spasm. In mild cases abduction to 70° may be possible without pain and then, as the greater tuberosity passes under the coraco-acromial ligament, severe pain is felt which subsides at 110° to return at the same point as adduction from the vertical occurs. During this movement one usually notes the "jog and wince" described by Codman. Rotation of the arm is prevented by spasm. Extreme tenderness is found at the insertion of the deltoid. X-ray only shows that the humeral head is riding high in the glenoid fossa.

In moderately severe cases, if the shoulder is not injected with procaine after the method of Leriche, the muscles go into spasm and the head of the humerus remains high in the glenoid cavity with the arm maintained in a position of adduction. Gradually the pain lessens but the shoulder becomes stiff. The degree of stiffness varies with the severity of the rupture and the length of time before movement is started.

Treatment.—Moseley advances the following criteria for the surgical repair of the rupture: (1) clinical features indicating severe injury; (2) x-ray negative for fracture; (3) marked weakness in maintaining abduction after procaine injection.

In the treatment of recent partial ruptures the principle of movement is to be recommended. This is carried out in the relaxed muscle position, i.e., with the trunk flexed forward at the hips and the arm hanging downwards. Procaine injections, diathermy and massage are also employed. The average time loss, according to Mosley, is 10 to 21 days.

In the treatment of old partial ruptures the principle of movement is also to be recommended as described above for treatment of recent partial tears. Here the average time loss is about three months.

Recent complete ruptures should be repaired surgically at the earliest possible moment. Old complete ruptures call for special consideration of age and general health before surgical intervention is attempted.

INJURIES OF THE LOWER EXTREMITY

Time will allow reference only to one common injury of the lower extremity, simple sprain of the ankle.

Simple sprain of the ankle.—When a joint is suddenly and abnormally twisted or forced to its extreme limit of movement a characteristic type of injury occurs, commonly called a sprain. There is excruciating pain followed by a severe ache which may persist for many days. Movement of the joint aggravates the pain and leads to voluntary immobilization of the part. The injured area becomes very tender, swells rapidly and later shows ecchymosis; the temperature of the part rises and muscle spasm appears.

Most of us have been taught that a sprain is a partial or complete tearing of ligaments due to overstretching. In recent years this traditional view has been successfully challenged by Leriche.⁶ He has enunciated the opinion, backed by a large clinical experience, that the *majority of the sprains are really local functional circulatory disturbances of traumatic origin*. He classifies sprains into three groups: simple sprains; sprains complicated by laceration of ligaments; and sprains complicated by avulsion of bone.

A simple sprain, according to this authority, has a symptomatology due principally to the abrupt excitation or injury of the nerve endings—with which all ligaments are well supplied—caused by trauma to the involved ligaments.

Leriche maintains that this type of "pure sprain" may exist, and frequently does so, without macroscopic lesions of the affected ligaments. He considers that lacerations of ligaments and avulsion of their bony insertions are complications which make the prognosis less favourable but which do not essentially alter the symptoms.

Diagnosis of simple sprain.—In a simple sprain the tenderness is well localized over the involved ligaments and there is not marked tenderness over their bony insertions. The latter symptom indicating as it does the possibility of fracture-sprain, calls for x-ray examination. Actual laceration of ligaments can only be diagnosed when the involved ligament, having been put on the stretch, is found to reach beyond its normal limits. Also digital pressure on the stretched ligament may disclose lack of resistance as compared to the normal side. The examination is, of necessity, performed under procaine infiltration of the affected parts.

For the past fourteen years Leriche has made procaine infiltration of the involved ligaments a part of his diagnostic and therapeutic regimen and is most emphatic about its value. Nor can it be doubted that freedom from pain and muscle spasm is essential if a thorough examination is to be made. Furthermore, Leriche's technique has a very valuable therapeutic effect: it breaks the vicious circle of vasodilatation and oedema described above and thus markedly shortens the recovery period.

Treatment.—The tender areas are infiltrated with 1% procaine solution (without epinephrine), 10 to 15 c.c. being usually adequate. No immobilizing dressing is applied and the patient uses the part immediately.

Many Canadian and American surgeons use modifications of Leriche's method of treatment for simple ankle sprain. Recently McMaster⁷ reviewed 500 cases of ankle sprain among service personnel. In 200 instances he used a modification of Leriche's method with the greatest satisfaction. Following infiltration with 10 to 20 c.c. of 2% procaine (without epinephrine) an elastic bandage was applied and full activity resumed, except for running and jumping. The patient was instructed that his foot must not be kept still, not even when sitting down. The bandage was removed by the patient one or two hours after its first application and reapplied by him. There was daily check-up by the surgeon. McMaster reported that all patients thus treated and sent to duty did better than those who rested; their disability seldom lasted longer than two or three days. Re-injection was never necessary.

Alexander⁸ has previously reported on the treatment of 500 civilian patients in whom a modification of Leriche's technique was used to advantage. When a

complete tear of the ligament or a fracture-sprain had been ruled out by appropriate means the tender areas were injected with 10 to 20 c.c. of 2% procaine (without epinephrine) and the swelling massaged out. Then adhesive strapping was applied in stirrup fashion almost around the foot and extending up the leg to the junction of the lower and middle thirds. Before applying the adhesive tape Alexander recommends shaving and the application of tincture merthiolate followed by mastisol in order to prevent skin infection under the adhesive dressing.

LOW BACK STRAIN

The term "strain" is somewhat loosely applied to a muscular injury sustained by sudden forcible contraction or sudden violent stretching of a muscle or muscles. The actual lesion is thought to be rupture of some of the fibres of the aponeurotic origin or insertion or, of the muscles themselves. However, no gross rupture is palpable or visible. Strain bears the same relationship to muscles that sprain does to ligaments.¹⁸

When a strain occurs there is sudden pain and disability after the violence has been exerted. The pain may abate for a short time and be replaced by an ache localized over the site of the injury. Swelling, diffuse local tenderness and muscle spasm appear. Contraction of the involved muscle increases the pain. Simple muscular or ligamentous strain is the most common industrial injury. It is generally due to lifting a heavy weight without proper stance or method, to attempting to carry a too heavy load or to the accidental sudden increase in the load, as when one man of a two man team carrying a heavy beam, suddenly and unexpectedly lets go his end of the beam. Many workmen complain of sudden pain in the back or a sudden "snap" as if something had given away. Frequently the injured man can point to the site of pain, most commonly located in the lumbar region and often extending over the flanks.

Treatment consists of immediate application of cold with support and rest. Later, heat and massage are indicated. In a week or ten days, graduated remedial exercises are advisable. In this regard Kessler's remarks are apropos:

"The simple muscular or ligamentous strains are the most common result of lifting efforts and in ordinary cases, with proper treatment, should cause a temporary disability period not exceeding two or three weeks. Rest, support, cold and massage during the first few days followed by exercises to maintain the muscular tone which is lost so rapidly, will ensure an early return to work, provided there is an absence of compensation neurosis."

SPRAIN OF DEEP LIGAMENTS

This type of injury to the back is as uncommon as simple muscular strains are common. The anterior and posterior ligaments of the bodies of the vertebræ or the ligamenta subflava are only injured in very severe accidents which produce dislocations or fractures or similar injuries. In these cases the deep-seated pain and tenderness, the marked muscle spasm and limitation of movement denote the severity of the injury and the necessity for immobilization and prolonged protection from use.¹⁹

PSYCHOSOMATIC PROBLEMS IN INDUSTRIAL SURGERY

Obviously this is a subject that merits a much fuller discussion than my limited space will permit. Nevertheless, the question is of such importance in the duties of an industrial surgeon that one can not refrain from mentioning, even in somewhat dogmatic fashion, some of the psychosomatic aspects of injury in industry.

Luck¹⁵ has demonstrated that psychologically maladjusted individuals were not rare in the armed forces. It naturally follows that they are not rare in industry. When many individuals react in the same way to a given stimulus their reactions are said to be "average reactions". According to Kessler,¹⁶ the well known American authority, more than 50% of all individuals who experience an automobile or industrial accident react "neurotically". One is left no alternative but to consider a traumatic neurosis as an average mental reaction.

Lecky has suggested a theory of unification and consistency of the personality which, in my opinion, offers the most commonsense explanation of many of the psychic phenomena commonly occurring after a comparatively minor accident. Lecky conceives of the personality as a system of ideas or values grouped about the individual's idea of himself and representing all contact between the individual and his environment from birth to adulthood. These concepts or values become organized into a consistent scheme of life, into a workable theory of the living world which is used by the individual in making his adjustments and solving all his personal problems. Out of the manifold experience of his relationship with his environment, his parents, brothers and sisters,

playmates and schoolmates, social and vocational contacts, he evolves a concept of life about him. If the unity of this concept is to be maintained there must be a guiding principle of some sort: the individual is constantly looking for some scheme according to which he will be able to avoid conflict. Inevitably he must develop that scheme on the basis of his own experience. By the age of five, usually, he has formulated such a scheme.

The ego, that is, his conception of himself, has been generalized out of practical experience and has been found to work satisfactorily. Parents and others are included in this thought organization but by no means can, or will, he embrace any idea or concept which conflicts with this "build-up" of himself. Any experience which disturbs his idea of himself upsets the consistency and unity of his thought organization. Inability to incorporate such an experience into his scheme can cause as much nausea and regurgitation as can be caused by actual physical changes.

The development of traumatic neurosis.—A commonplace occurrence is an average man driving his car down a familiar street with no thought of any danger. Suddenly another car, approaching unnoticed from the rear, collides violently with his car and completely overturns it. Mr. "Averageman" crawls out from behind the wheel to find that he is safe and sound, that he can walk and, in fact, that he is uninjured beyond a few bruises. At first his only emotion is one of pleasure at escaping injury. A few hours later when he is at home he begins to experience a few anxiety symptoms: his voice is shaky, his fingers are tremulous, he perspires easily, his pulse is rapid and his facial expression is one of great anxiety. With time these symptoms become intensified and increase. They may arise within a few hours or several weeks after the accident.

What is the explanation? His symptoms arise from a feeling of insecurity caused by the thought that his experience in the car accident was inconsistent with his theory or scheme of life. It was consistent to expect and predict that he would be severely injured in an accident in which his car was completely turned over. Instead he was entirely uninjured! This was quite contrary to all expectation based on his own system of values and build up from years of experience and contact with the world. As

he thinks this over he becomes worried and uncertain; he feels insecure because his system or scheme of life has been tested and found wanting. It did not work. He would have expected serious injury in his accident but here he was unhurt! Now he is uncertain about his scheme of life and feels insecure about the future. He does not know whether things are going to work out this way again or not. He feels unsafe not only in respect to traffic accidents but towards every one of the routine acts of his every day life. He is afraid to go out of the house for fear of what may befall him. Since his scheme has fallen down in one of its main concepts it may fall down in respect to all of the others. He sleeps with difficulty and then has terrifying dreams. These latter represent a reacting of the accident experience but somewhat distorted by his unconscious mind in order to view the accident from every possible angle in an endeavour to solve the baffling inconsistency which has upset his scheme of life.

The man's symptoms, usually those of an anxiety state, are an expression of a tension resulting from the expenditure of energy by the personality in an attempt to unify and achieve logical balance and consistency. This process may, and indeed, often does, go on to the complete disorganization of the personality.

In contrast to the above example, if a man receives a severe injury which is predictable on the basis of his own organized system or scheme of values or concepts, he does not develop a neurosis because there is no inconsistency between theory and actuality. His mental organization remains logical and consistent. He has had an accident, he was injured, and that was what one would reasonably expect. In this connection I have noted in "compensation board work" that the workmen who develop neuroses are almost always those who have had comparatively trivial or minor injuries.

Traumatic hysteria.—In the great majority of cases of industrial accident however, the circumstances are consistent with the individual's scheme of life, and the symptoms that develop are not those of an anxiety state but may be invented for a definite but unconscious motive. This mechanism can best be understood if one considers the scheme of the personality in graphic form (Fig. 1).

The large outer circle represents the personality including all the values, concepts, ideas,

beliefs and attitudes built up and integrated into a consistent organization affecting as it does the individual's idea of himself, the latter being the core of the figure of the personality circle.

If an individual be insulted, there is introduced within the personality circle a low value of himself. Since he naturally has a very high value of himself the introduction of this low value immediately causes a marked psychic tension due to the conflict or inconsistency of these ideas (Fig. 2). It is impossible for both a high value and low value of one's self to co-exist. Since a high value is of greater importance and intensity something must be done to get rid of the low value. This may be done in one of several ways. The low value may be thrown out of the personality circle by striking the original attacker or by calling him some obscene name or by forcing him to apologize. The equalization of value for value erases the intruding low value from the scheme of the personality and thus removes the psychic tension and all associated symptoms.

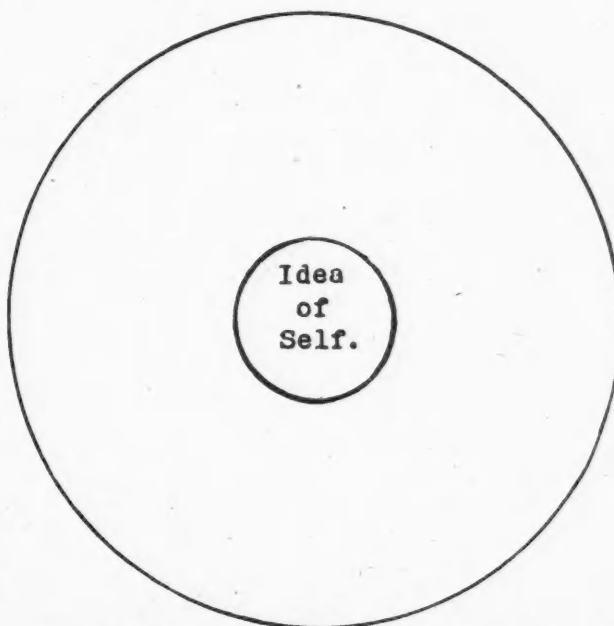


Fig. 1.—The outer circle represents a "scheme of life" composed of a system of ideas or values all consistent with the central core, "the idea of self".

In similar fashion an insult to the body (soma)—a part of the personality—introduces a low value into the organization. This low value must be eliminated since it is inconsistent with the high value that the individual holds for his soma. The low value can be eliminated by an equal value being given to it in return, this latter value constituting a form of com-

pensation for the damage suffered by the personality.

The form that this compensation takes will depend on the nature of the standards existing in the national social attitudes or ideology. In Canada and the United States this value is a monetary one. In Russia, instead of desiring money as compensation for damage to the soma or personality, workmen rather seek better rations, a holiday in convalescent homes, particularly in some faraway rest home in the Caucasus.

In cases of traumatic hysteria the symptoms are characterized by an intensity or persistency out of all proportion to the physical condition present. A lacerated scalp, a wrenched knee or a strained back are featured by a period of complaint and disability far beyond the ordinary expectations. This is particularly true of head injuries.

The people who develop these mild hysterical symptoms, on analysis, are found to represent a cross section of the community with only a few "hysterics" and over-compensated personalities included. Most of them are mentally well adjusted individuals from all classes in the social scale, including professional and wealthy people as well as those in the lower economic and vocational groups.

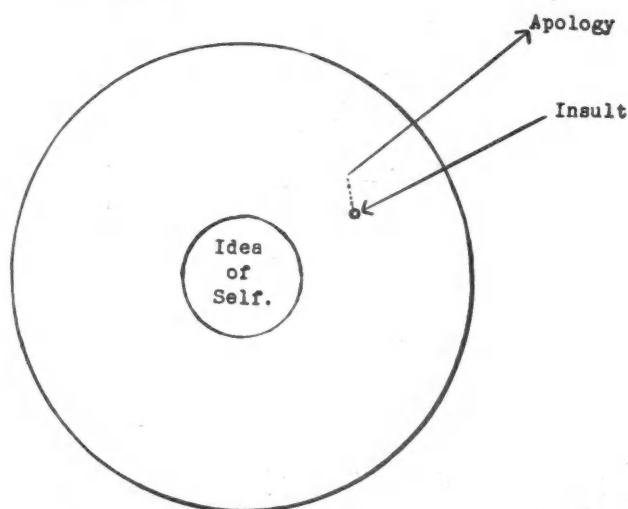


Fig. 2.—Hysterical symptoms are the manifestations of a psychic tension between a low value introduced into the scheme of life and the high value that the individual holds of himself. The "low value" may be a personal insult (psychic trauma) or a physical injury (somatic trauma).

Those who have had the opportunity of carefully examining and talking to a large number of injured workmen will agree that the incidence of deliberate planned assumption of symptoms,

or malingering, is rare.¹⁷ The cause of symptoms lies deeper in more fundamental psychic motivation: the preservation of the consistency and unity of the personality. As soon as compensation is paid the tension is released because the low value introduced into the personality circle has been equalized.

The term "gold cure" has been applied to this mechanism (Strumpell) and many writers, particularly German writers, have interpreted this behaviour as being due to a desire for financial gain. In our opinion, and it is one held by other and more experienced observers,¹⁶ these injured workmen are not blameworthy. They are doing what seems to them to be consistent with their scheme of life. In about 5% of cases the symptoms are much more intense and may take on the form of classical hysteria with paralysis, contractures, etc.

Treatment of traumatic hysteria.—The award of compensation acts as treatment and cure in the great majority of these cases. Nor is the size of the award necessarily a factor in the effectiveness of the cure. In conclusion, it would seem equitable and practical to compensate these people for time loss on the basis of their physical disability without too much consideration of the number and nature of their symptoms, some of which are rather bizarre.

Treatment of traumatic neurosis.—Individuals suffering from traumatic neurosis do not recover with "gold treatment". They require therapy of a psychological and sympathetic nature. They are casualties of industry as much as the man who has an amputated foot and they may be much more difficult to rehabilitate. A man who is lame in both legs may be able to do a full day's work while a neurotic individual may be completely incapacitated. One cannot but surmise that future generations will regard present methods of "disposing of" these unfortunate and mentally disabled individuals in much the same light in which we at present regard the primitive methods employed in the not-so-remote past when the mentally ill were scourged and burned in order to exorcise the devil which had "possessed" them.

SUMMARY

1. The frequency and importance of injuries to the hands of working men are stressed and the therapeutic principle of early elevation after injury emphasized.

2. The principles of the diagnosis and treatment of tear of the "rotator cuff" of the shoulder are discussed.

3. Leriche's method of treatment of sprains is reviewed and its application to sprain of the ankle discussed.

4. Common low back strain is discussed and its treatment briefly referred to.

5. Traumatic neurosis and traumatic hysteria are differentiated and treatment briefly discussed.

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THE RH FACTOR AND ERYTHROBLASTOSIS*

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DURING the past five years in the field of pædiatrics no other condition has created more interest than the relationship of the Rh factor to erythroblastosis fetalis. The term erythroblastosis covers several conditions which have unlike clinical manifestations but seem to have a common pathological background.¹ These are certain types of intra-uterine fetal death, congenital fetal hydrops, icterus gravis neonatorum and certain cases of congenital anæmia. The outstanding features of all these are fetal types of blood formation, erythroblastosis, or the presence of an abnormal num-

ber of nucleated red cells in the circulation, anæmia, jaundice, familial tendency and œdema of the body tissues. Recent investigation has added that it is probably associated with immune factors in the mother's blood, namely the Rh factor.

Fetal hydrops and icterus gravis have been known for some time.² In 1910 Schridde suggested that icterus gravis and fetal hydrops were related conditions. In 1912 Rautman gave the name erythroblastosis to the symptom complex. Blackfan, Diamond and Baty in 1932 observed the association of these two with congenital anæmia. Intra-uterine death of the fetus and fetal hydrops are problems of the obstetrician. Occasionally cases of fetal hydrops survive long enough to be seen by the pædiatrician but usually they die very shortly after birth.

Icterus gravis is the most frequent of all of the types of erythroblastosis fetalis. Fetal hydrops occurs about 1 in 1,500 deliveries whereas icterus gravis occurs in about 1 in 500. Icterus gravis has been reported in all races and both sexes.

The clinical manifestations of icterus gravis are (1) jaundice which commences at or near birth and increases to a very intense degree; (2) hæmolytic anæmia which progresses; (3) numerous circulating erythroblasts; (4) enlargement of the liver and spleen; (5) drowsiness and convulsions; (6) hæmorrhagic tendency occasionally also with purpura; (7) bile in the urine; (8) normal coloured stools; (9) direct van den Bergh; (10) fatal termination in a large proportion.

In the history one finds that usually there has been a normal child or children preceding the case and then all succeeding pregnancies show one or other of the types of erythroblastosis fetalis. Another feature often observed is the history of a placenta being larger than usual and a yellow staining of the vernix. The jaundice, which starts very early, may be so marked that one does not appreciate the pallor. The spleen and liver are invariably enlarged. Petechial hæmorrhage or gross hæmorrhage are not uncommon. The blood picture shows a macrocytic hyperchromic anæmia. The hæmoglobin is higher than the red blood count would warrant. The red count varies from 3.5 million down to as low as 400,000. The number of nucleated red cells varies, in some not being

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very high, in others 1 to 5 cells is an erythroblast. Reticulocytes, polychromasia and stippling are also present. This hyperplastic picture continues in dwindling degree in those cases which survive for a week or two when a hypoplastic phase sets in which may last for from three weeks to many months. It is this stage which in some of the originally milder untreated cases has been diagnosed congenital anaemia. If these patients are carried by the use of transfusion through the hypoplastic phase their blood production comes back to normal.

The white cells are often increased and there may be some immaturity. The platelets are decreased in certain cases, particularly those which have a high erythroblast count and these are usually associated with petechial haemorrhages and purpura. The prothrombin of the blood is often diminished. The jaundice in this condition may go to an extreme degree and is higher than that seen with complete atresia of the bile ducts. The intensity of the jaundice has no bearing on the prognosis. The van den Bergh is usually direct later, though it may be indirect early. The urine contains bilirubin and the stools are not acholic. The reason for this can be brought out by the pathology. Extreme drowsiness is common and occasionally there are convulsions. In many cases a fatal termination ensues in the first 24 hours. In those that survive, about 15% are mental defectives.

Landsteiner, Levine, and James³ in 1928 reported that after repeated transfusions certain individuals developed an iso immune reaction to the blood of the same group, having reactions as an evidence of this. Levine and Stetson⁴ in 1938 reported a case of a woman who had given birth to a macerated fetus having a nearly fatal transfusion reaction to her husband's blood and who had agglutination to 80% of the donors of the same blood group that were tried. Landsteiner and Weiner,⁵ 1940, working with rabbits immunized with Rhesus monkey blood found that when the A and B and M and N factors were absorbed there still remained a factor in the immune rabbit blood which reacted with certain human bloods. This was given the name Rh factor. They showed that 85% of humans had this factor and 15% did not.

Levine, Katzen and Burnham⁶ in 1941 described three cases of erythroblastosis whose mothers had antibodies in their blood to the fathers. They considered that these mothers had

become immunized from the fetus to a factor inherited from the father. They suggested here the probable association of this iso immune reaction of mothers with erythroblastic offspring and the Rh factor described by Landsteiner and Weiner.⁶ Since the recognition of the probable association of the two a great deal of progress has been made. Levine *et al.*⁷ later stated that erythroblastosis fetalis results from iso-immunization of the mother from a dominant hereditary factor in the fetus and subsequent passage of these maternal immune bodies through the placenta and their continuous action on susceptible fetal blood.

It has been shown that in approximately 90% of cases the mother is Rh negative and the fetus and father Rh positive. Boorman *et al.*⁸ found Rh agglutinating factors in mother's serum to baby's blood in 44 out of 50 cases and in the other 4 to the A or B factor. Polayes⁹ reported 6 cases with Rh positive mothers, father and fetus where the mother's group O had anti A titre of 1-700 that normally it does not go over 1-100 and during pregnancy may go up to 1-300.

Weiner^{10, 11} has shown that there are many types of the Rh factor. Seven have been found and probably the eighth will be. He describes a case where the mother,¹⁰ infant and father were all Rh positive. The mother was Rh 1, the infant and father Rh 1 Rh 2. Apparently the mother had developed antibodies to the other Rh 2 factor in the baby. In all cases of erythroblastosis fetalis no case was disclosed in which the agglutinins of the mother's serum could not be accounted for by the Rh type of the father and infant.

The likelihood of erythroblastosis developing in an infant depends on certain factors. Racially amongst the white 85% are Rh positive and 15% Rh negative.^{12, 13} Amongst Negroes 95% are Rh positive and 5% negative and in Chinese 99.3% are Rh positive and 0.7% Rh negative. Pure Eskimos have about the same distribution as the Chinese.¹⁴ The incidence of erythroblastosis is three times as great in whites as in negroes and only 1 genuine case has been reported in an extremely large number of Chinese. In white people it should occur in 13% of all marriages but only occurs once in 200 pregnancies. The reasons for this are:¹² (a) small families; (b) mother does not produce antibodies; (c) father heterozygous; (d) antibodies do not get over to infant.

Race *et al.*¹⁵ believe there is a predominance of homozygous fathers among the group of matings which develop erythroblastotic children. Taylor and Race¹⁶ describe a serum which they believe shows the Rh negative and heterozygous group. It did not agglutinate 20% of the population. With this serum they found a predominance of homozygous fathers among the 50 affected families which they studied.

Certain observers have postulated that if an Rh negative mother once has an erythroblastotic infant each subsequent Rh positive pregnancy will be affected.^{12, 17} Docheray and Sachs report four Rh negative women who were pregnant and had Rh antibodies who gave birth to Rh positive infants who were not affected.¹⁸

Identical twins have been seen, both of which were affected¹⁹ and also non-identical twins where the Rh positive twin died with the disease and the Rh negative was not affected.²⁰ Potter found no evidence of inheritance in 50 mothers investigated.¹⁷ Cappell²¹ states that the majority of women exposed to risk by pregnancy or transfusion do not become immunized.

Previous transfusion in the mother is a common cause for erythroblastosis in the first-born and tends to produce a more severe type of the disease.²² Davidsohn²³ gives the conditions influencing the severity of fetal erythroblastosis as (a) age of fetus at which the Rh antibodies begin to act; (b) length of time of exposure; (c) strength of Rh antibodies; (d) permeability of the placenta.

Antibodies usually are demonstrable in the mother's blood. Sometimes these are difficult to demonstrate because of inhibitor substances.^{11, 24, 25} These may be removed and then the serum shows a positive agglutination. Titre is usually highest 8 to 20 days after childbirth.¹¹ The titre can be raised by injection of Rh positive blood into a mother who has previously given birth to a child with erythroblastosis.²⁵ Sizeable titres have been found in the breast milk¹¹ and one case was reported in which it was believed that the breast milk caused the erythroblastosis.¹⁰

In treatment of erythroblastosis transfusion has been and still is the most important measure. Mollison²⁶ and others²⁷ state that Rh negative cells survive much longer in an infant with erythroblastosis than Rh positive. Weiner¹⁰

states that mother's washed cells are always suitable. Denis²⁸ advocates the use of Rh positive transfusions to get rid of the existing antibodies in the child.

Since the beginning of 1935 there have been 143 cases (Table I) of the erythroblastosis syndrome (icterus gravis and congenital anaemia) admitted to the hospital. The incidence has been steadily climbing; 110 of these cases have been seen since the beginning of 1940 and this latter group has been studied for the data in the tables. The mortality rate for the whole period has been 43.3% and with the exception of the last 5 months has been in the neighbourhood of that for each year of the whole period. This will be taken up later.

Regarding the age on admission (Table II) 66 of 110 were admitted in the first 3 days and there were 41 deaths. This simply means that the more acute cases have a higher mortality.

Previous family history (Table III) is found relatively frequently where the patient is the third or later pregnancy of the mother. Eight of the cases were first-born. In two of the cases the mother had received a previous transfusion. In one other case the mother died following a transfusion given at the time of a subsequent miscarriage.

Distribution of blood group (Table IV) is essentially the same as for the general white population. Intense jaundice (Table V) was present in 81 of the 102 cases where the history was obtained. It was noticed at or shortly after birth in 65 cases. Pallor alone was the outstanding feature in 16 cases and cyanosis in 5. Purpuric spots, oedema and hæmorrhage were also noted.

There was no seasonal incidence and the distribution by sex was approximately the same as one would expect according to the usual distribution of sex at birth, being slightly higher in the male (Table VI). The liver was palpably enlarged in all cases and the spleen in 84% of cases. Increased nucleated red blood cells were found in 60% of the cases examined. The presence of these has no relationship to the prognosis. From a clinical impression it has been our experience that those cases with an extremely high percentage of nucleated cells with extreme anaemia and those cases with an external degree of jaundice associated with relatively slight changes in the blood are most likely to end fatally. Serum protein measure-

ments have been made on recent cases and show it to be around the œdema level in all.

In testing the Rh factor of the blood of the baby, (Table VII) mother and father in 63 cases it has been found that the classical set-up of father and baby Rh positive and mother Rh negative occurred 59 times. So far there have been four cases with unusual antibodies present. The mother's blood has revealed antibodies in 40 cases of 63 cases tested. There have been two cases where antibodies to the infant's blood were present in the mother and the infants have been well. In one of these a previous pregnancy was a definite case of erythroblastosis proved by postmortem and other clinical findings. Breast milk has been tested in 11 cases and found to contain antibodies in 7 cases (Table VIII).

TABLE I.

CASES OF ERYTHROBLASTOSIS ADMITTED TO HOSPITAL

Year	No. of cases	Deaths	Mortality
			%
1935.....	2	1	50.0
1936.....	4	3	75.0
1937.....	6	3	50.0
1938.....	11	3	36.3
1939.....	9	3	30.0
1940.....	16	5	31.2
1941.....	10	4	40.0
1942.....	11	7	63.6
1943.....	19	12	63.1
1944*.....	19	7	36.8
1945*.....	20	12	60.0
1946—to May 30*†....	16	1	6.2
	143	61	43.3

*Rh neg. blood used for transfusion.

†Only 5 mos. Plasma used between transfusions.

TABLE II.

AGE ON ADMISSION—CASES OF ERYTHROBLASTOSIS

Age admitted—days	Number	Deaths
Under 1.....	46	29
1-2.....	10	7
2-3.....	10	5
3-4.....	5	0
4-5.....	5	0
5-6.....	7	2
6-7.....	5	1
Over 7.....	22	3

TABLE III.

FAMILY HISTORY—CASES OF ERYTHROBLASTOSIS

Place in family	+ve	Previous family history
1st born.....	8	..
2nd born.....	44	3
3rd born or later.....	45	29

TABLE IV.

DISTRIBUTION OF BLOOD GROUPS

Group O.....	42%
Group A.....	44%
Group B.....	10%
Group AB.....	4%

TABLE V.

OUTSTANDING SYMPTOMS (102 CASES)

Jaundice.....	81 cases
(a) from birth—65	
(b) onset later—16	
Pallor alone.....	16 cases
Cyanosis alone.....	5 cases
Purpuric spots with jaundice or pallor.....	9 cases
Edema with jaundice.....	6 cases
Hæmorrhage.....	4 cases

TABLE VI.

MISCELLANEOUS FINDINGS

Sex—Males, 58 cases; females, 52 cases.	
Seasonal incidence.....	None
Liver enlarged.....	100% of cases
Spleen enlarged.....	84% of cases
Nucleated red cells in smear.....	60% of cases
Serum protein (8 cases) 4.5 to 5.3 gms. %.	(Average, 4.9 gms. %)

TABLE VII.

ANTIBODIES IN MOTHER'S BLOOD

Number tested.....	59
High titres*.....	23
Moderate titres.....	13
Negative.....	23
Rare group.....	4

*2 cases had antibodies present to babies' cells and babies did not develop erythroblastosis.

TABLE VIII.

BREAST MILK

Number tested.....	11
Antibodies present*.....	7
Antibodies not found.....	4

*1 case in which the baby did not show any signs of erythroblastosis.

TREATMENT

The treatment used in these cases has been transfusion as frequently as is necessary to keep the hæmoglobin above 70%. In order to conserve veins two transfusions are usually given at one time with 6 to 12 hour intervals between and the intravenous kept running with saline or glucose in saline. Recently we noted that certain cases became œdematous with this routine so we started to measure the serum protein. This was found at or below the œdema level. As a result of this plasma has been given as soon as the child is admitted, followed by transfusion and the intravenous kept running

with plasma by the continuous drip method. This has been the essential change in our treatment for the last 5 months during which the mortality has fallen.

Prior to 1944 transfusions were of the same general blood group. For 1944 and 1945 Rh negative blood was used. There was no decrease in the mortality as a result of this. There was one family where a previous child recovered using Rh positive blood that a subsequent child who was given Rh negative blood died. Obviously Rh negative blood is not the answer for the treatment of this condition.

It has been our practice to give calcium gluconate intravenously in the deeply jaundiced cases in an attempt to hold the bilirubin in solution. Crude liver extract is given intramuscularly daily for 2 weeks in those cases which survive the original disturbance of the first 24 hours.

SUMMARY

This is a review of some of the literature on erythroblastosis fetalis with a discussion of the cases that have been admitted to the Hospital for Sick Children since the beginning of 1935.

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THE ESTIMATION OF LIVER FUNCTION*

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WE have tried to approach this problem from the general practitioner's standpoint, and the reader is asked to bear this constantly in mind. The differential diagnosis of liver disease is so difficult that the average physician is very uncertain when confronted with anything more than the simplest case of catarrhal jaundice. He does not have a profound knowledge of the biochemical problems involved, but he should have a working acquaintance with the outstanding features of liver physiology and he does have laboratory facilities in hospitals and public health establishments within easy reach of his field of practice. Perhaps we may be justified in attempting what some might consider an over-simplification of the problems involved because I believe such an approach will serve to encourage rather than discourage the family physician, and thus enable him to improve his diagnostic ability.

A definite revival of interest in liver disease was evident even before the late war, but the extensive experience of army medical officers in Egypt, North Africa, and Italy has served to stimulate research, particularly with reference to infectious hepatitis. This disease has been described as the great disease of World War II. It is important to note that the resulting extensive literature has revealed an exhaustive study of both clinical and laboratory aspects of liver disfunction; in other words, the clinical side has not been neglected.

Most physicians will agree, I think, that of all the vital organs of the body, the liver is the one which provides the most difficult problems in diagnosis. It is not an active organ in the muscular sense, like the heart whose contractions create sound which we can hear and evaluate. It is not like the lungs whose movements, though passive, create conditions which are readily detected by stethoscope and fluoroscope. It is not like the stomach and intestines whose symptoms in disease arise almost wholly from conditions which interfere with the normal muscular

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activity of the tract. The liver lies in its allotted space, impassive and relatively immobile, yet it is charged with more varied responsibilities and more diverse functions than any other organ in the body.

A quick glance at some of these functions might well serve a useful purpose at this point. Among the most important may be listed: glycogen storage; regulation (in conjunction with the pancreas, suprarenals and central nervous system) of the blood sugar levels; the manufacture and excretion of bile, which, in turn, aids in fat digestion; the production of serum protein and amino-acids and the regulation of the albumin-globulin ratio; the production of urea from amino-acids; other detoxifying powers, as, for example, in the acetylation of the sulfonamides and the synthesis of hippuric acid brought about by the conjugation of benzoic acid and glycine. In addition, it is responsible for the production of fibrinogen and heparin, for the storage of iron and copper, and with other tissues, for the production of heat and the regulation of blood volume.

With this formidable array of functions in mind, it is not difficult to understand that the liver is vulnerable to attack from many quarters and by various agents. That this assumption is correct is borne out by the variety of clinical conditions in which the liver would seem to be the principal organ affected. It would be reasonable also to expect that the functions of this organ might be deranged by such attacks in varying degree, and possibly in a selective manner. That this is indeed the case is indicated by the results obtained in experimental and clinical studies applying the various tests designed to measure such functions. One test (or several) may show impaired function while others yield normal values. Presumably this is because the disease has not impaired all the functions of the liver equally. The main difficulty in interpreting liver function tests would seem to be in the fact that the liver possesses an enormous factor of safety and therefore a large proportion of the hepatic tissue must be put out of action by disease before abnormal results can be expected in these tests.

The problem must be viewed as a whole and in proper perspective. From such a survey, it becomes increasingly apparent that there is no substitute for a careful history and physical examination. If we correlate the findings ob-

tained in this manner with a knowledge of the physiology and pathology of the liver we have gone a long way towards an understanding of the average clinical case. If to this we add the information obtained from a few simple laboratory tests such as that for bile and urobilinogen in the urine and an inspection of the faeces, we will be enabled to make the correct diagnosis in two-thirds of the cases of jaundice. The general practitioner should first aim, therefore, at perfecting himself in the art of history-taking, physical examination and the interpretation of the simpler laboratory procedures.

In cases where jaundice is present our first concern is to decide whether the jaundice is due to intrahepatic or extrahepatic causes. If the liver is of normal size, the stools are dark brown in colour, and the van den Bergh test of the blood reveals only unchanged bilirubin in increased amounts, one may be certain that the liver plays no part in the disease process. Such jaundice is hæmolytic in nature. In all other cases, the van den Bergh test is of no value in differentiating the cause and is only to be used in estimating the degree of jaundice and in following the course of the disease. It is of particular value in the diagnosis of latent jaundice.

Complete obstruction of the common bile duct, or hepatic ducts, whether due to stone, malignant disease or infective processes will result in clay-coloured stools containing no urobilinogen, but large amounts of bile. Partial obstruction will naturally present mixed findings and here the history of onset and physical findings will be of the utmost importance.

If the liver is altered in size one may conclude that it is abnormal. The causes of enlargement are numerous. Among the most common are: congestion due to right heart failure; portal cirrhosis in its earlier stages; biliary cirrhosis; acute infectious hepatitis, malignant disease of the liver and obstruction of the common bile duct. In enlargement with visible jaundice the history of an acute onset with malaise, anorexia and fever followed in three to six days by enlargement and tenderness of the liver with discomfort but not true pain in the hepatic area, are strongly suggestive of acute infectious hepatitis. A palpable spleen is further evidence of this condition.

Where the onset of the jaundice is preceded by colicky pain in the right upper quadrant,

the diagnosis is almost always apparent. Stone in the common duct may, however, occur in the absence of symptoms and later may cause obstruction and a painless jaundice. In differentiating stone from carcinoma of the head of the pancreas, the common bile duct or the gall bladder, the examination of the spleen is important. Enlargement of the spleen is rare in obstruction due to malignancy.

Turning to a consideration of the laboratory tests for liver function, the practitioner will find it useful to divide his cases into two groups: those with jaundice and those without. In the former group, the usual problem is to decide whether the jaundice is obstructive or parenchymatous, and whether or not surgical intervention is indicated. Probably the tests most useful in indicating extrahepatic obstruction are the following.

(a) *Urinary urobilinogen*.—Remember that the specimen must be freshly passed and tested promptly. In obstruction of the common bile duct the amount formed is usually negligible, whereas in hepatogenous jaundice (and in liver disease without jaundice) it is increased (above 1 in 20).

(b) *Alkaline phosphatase estimation of blood*.—This enzyme is produced by osteoblasts and excreted in the bile. It is raised above 4 Bodansky units in adults and 15 units in children where obstruction is present. By itself, however, it is not of much diagnostic aid, since it may indicate only the degree of biliary obstruction which can be estimated much more simply by the urinary urobilinogen. The blood phosphatase level is, of course, raised in such non-hepatic diseases as Paget's disease, hyperparathyroidism and in rickets.

(c) *The van den Bergh test*.—This is only of value where the reaction is entirely indirect as in hæmolytic jaundice. This reaction indicates that the liver has no part in producing the jaundice. A direct reaction to the van den Bergh test has the same significance as bile in the urine (except in cases where extreme kidney insufficiency exists), and since the test for bile in the urine is much simpler, it is preferable. The van den Bergh test is useful, however, in following the degree of jaundice during the course of the disease.

The main causes of failure of these simple measures to indicate the correct diagnosis are:

(a) incomplete obstruction due to stone, which

may be associated with secondary hepatitis; and (b) the complete obstruction encountered in certain stages of severe infections or toxic hepatitis. This usually does not last more than two weeks.

To differentiate between surgical and medical jaundice or in other words, to indicate whether or not the liver parenchyma is involved, the following tests will prove useful.

(a) *Galactose tolerance test*.—This test is only valuable in early cases. Of 40 grams of galactose ingested, more than 3 grams excreted in the urine in the next five hours indicates intrahepatic damage. Therefore this test should yield a normal result early in common duct obstruction from stone. This test is of no value where impairment of intestinal absorption is present.

(b) *Hippuric acid test*.—The liver is a detoxifying organ and this function can be measured by determining the synthesis of hippuric acid from ingested sodium benzoate (6.0 gm. in 30 c.c. water). In normal individuals 3.0 to 3.5 gm. hippuric acid is excreted in the urine during the following four hours. Disturbed intestinal absorption does not invalidate the results, but the test is of no value in renal insufficiency as indicated by nitrogen retention.

(c) *Cephalin-cholesterol flocculation test*.—The liver is concerned in the concentration of plasma proteins and in the constitution of the plasma globulins. In liver damage the amount of albumin diminishes while the globulin may remain unchanged or actually increase in amount. The important thing, apart from the total protein and albumin-globulin ratio, is the character of the globulin. Of the several tests to detect pathological globulins, probably the cephalin-cholesterol flocculation test of Hanger is the most useful. It will detect early globulin changes in acute hepatitis as well as those present in the chronic forms. Because there is some danger of false positive reactions, only dense flocculations should be considered significant.

Coming to a consideration of liver function tests in patients without jaundice, we are faced with the necessity of employing the more sensitive procedures available. Slight deviations from the normal may be significant. Prominent among the liver conditions in which such deviations may be of material value in diagnosis and treatment are: early cirrhosis; chronic cholecystitis with accompanying hepatitis; toxic

hepatitis in its early stages, particularly during therapy with hepatotoxic drugs; acute infectious hepatitis without jaundice.

In these diseases the clinician may look for considerable help from the laboratory. The most useful tests are: the quantitative van den Bergh; urinary urobilinogen; the hippuric acid test; the estimation of cholesterol esters; the galactose tolerance test; the cephalin-cholesterol flocculation and the bromsulphthalein tests. The last mentioned is based on the fact that the dye is normally excreted by the liver with the bile. In disturbances of biliary excretion the test is of no value since obstruction and hepatitis both interfere with the excretion of the dye. Furthermore the dye is believed by many to have an unfavourable effect on the liver in the presence of jaundice. There is no evidence that it exerts a toxic effect in non-icteric patients. On the other hand its retention in the blood after intravenous injection is considered by most investigators to be one of the most sensitive indications of impaired liver function. The hippuric acid test has not proved to be of value in non-icteric acute hepatitis as it is often low in the active stage of the disease and high during convalescence.

It is to be emphasized that no single test provides reliable information at all times, but it seems justifiable to regard abnormal results with more than one test as evidence of hepatic disturbances.

SUMMARY

Diseases of the liver are frequently difficult to diagnose. The diagnosis must largely be arrived at by detecting and measuring derangement of function. The functions of the liver are numerous and laboratory tests are still not sufficiently sensitive to detect minor losses of function. History-taking and physical examination, together with a few simple laboratory tests such as those for bile and urobilinogen in the urine and an inspection of the faeces, constitute the most important steps in arriving at a diagnosis in the majority of cases.

The van den Bergh test will differentiate hæmolytic jaundice from other types, but apart from this is only of value in estimating the degree of jaundice and in following the course of the disease.

The galactose tolerance test if used early in the disease is useful in detecting damage to liver parenchyma. Its value is destroyed in the

presence of impairment of intestinal absorption. Other useful tests for liver damage are the hippuric acid and the cephalin-cholesterol flocculation tests. All of these tests may be employed in the presence of jaundice.

In non-icteric liver disease, the bromsulphthalein test is safe, relatively sensitive and in practice has proved useful.

No single laboratory test can be relied upon at all times, but it seems justifiable to regard abnormal results with more than one test as evidence of hepatic disturbance. This observation is particularly valuable in studying non-icteric liver disease.

CIRCUMCISION AND VENEREAL DISEASE*

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THE advisability of routine circumcision has long been a subject of medical controversy. It is seldom however, that the discussions on the subject are based upon new factual observations. Since army experience provides an unusual opportunity to collect such data, it was decided to conduct the present investigation.

Before recording our observations on the incidence of circumcision amongst soldiers with venereal disease, some of the standard arguments for and against this operation will be reviewed. Those who advocate routine circumcision usually base their views upon the general consideration that the procedure renders subsequent cleanliness and hygiene of the penis so simple that no special attention or manipulation is ever necessary. They consider circumcision a justifiable method of rendering the delicate coronal membrane much more resistant to injury and infection. They argue that the future dangers of balanitis, painful erection, unsatisfactory coitus and paraphimosis can be removed by this simple prophylactic operation. If it is done with good judgment and reasonable surgical skill its dangers should be negligible.

On the other hand, the opponents of routine circumcision state that it is unwise to remove a protective covering which was obviously

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provided by nature for a purpose. They point out that the routine subjection of babies to an operation which has definite dangers is vicious and purposeless surgical interference. Frequently, good judgment and surgical skill are not exercised. The hazards of the operation then do not justify its routine or even frequent performance. They state that in practically all cases adequate instruction of the mother and stretching of the foreskin will render operation unnecessary. Another, less frequently voiced, yet very real objection of the operation, is the danger of meatal ulceration. This occurs not infrequently in circumcised infants who have ammoniacal diaper burns. This complication is preventable if precautions are taken.

Besides these valid arguments on medical grounds there is great discussion of the religious and personal aspects of the problem. For example some uncircumcised people claim that the toughening of the coronal membrane after circumcision reduces the sensory impulses from the region and renders coitus less pleasurable.

MATERIAL

1. *The V.D. group.*—Information was collected regarding previous circumcision and final diagnosis on 1,304 consecutive patients at a Canadian Army V.D. treatment centre in the field.

2. *Control group.*—1,000 recruits at an Army Reception Centre were examined to determine the incidence of circumcision amongst Canadian Army personnel.

TABLE I.
(a) V.D. GROUP

Disease	No.	Non-circumcised		Circumcised		Observed difference over S.E. of D.
		Cases	%	Cases	%	
V.D.S.	100	90	90.0	10	10.0	11.8
V.D.G.	869	640	73.5	229	26.5	9.8
N.S.U.	185	140	75.5	45	24.5	6.7
N.S.F.U.	110	90	81.8	20	18.2	7.5
Balanitis. . .	22	22	100.0	0	0.0	...
V.D. warts. .	18	18	100.0	0	0.0	...
Total.	1,304	1,000	76.7	304	23.3	12.4

(b) CONTROL GROUP

*Controls	No.	Non-circumcised		Circumcised	
		Cases	%	Cases	%
Total.	1,000	520	52	480	48

*The control series was checked against the rate of circumcision in new-born infants at the Vancouver General Hospital. In the year 1945, of 2,001 male births 1,184 or 59% were circumcised.

RESULTS

The detailed results are shown in Table I (a and b). From these figures it will be seen that 76.7% of the V.D. Group were uncircumcised whereas in the control group, 52% were uncircumcised. The most striking difference is in syphilis where 90% of the cases were uncircumcised. That these figures bear statistical analysis will be seen from the accompanying figures in Table I. In each instance except balanitis and venereal warts, the observed difference is highly significant. The number of cases in the latter two diseases are too small to be of significance. However, it is accepted that these diseases are very rare in circumcised people.

DISCUSSION

The possibility must be considered that the higher proportion of uncircumcised soldiers amongst the venereal disease group may be due to a greater rate of promiscuous exposure amongst the uncircumcised. Selection may have taken place in this way. It is impossible to control this factor, but from general impressions it is considered unlikely that this group is significantly more promiscuous.

It is suggested from the present results that venereal disease is more prevalent amongst uncircumcised males. What are the possible explanations for this? In gonorrhœa it could be due to the fact that the foreskin, after coitus, retains infectious mucus. Here is an ideal environment of moisture and warmth, the organisms multiply and provide heavy contamination of the adjacent urethral mucosa.

That syphilis is more common in uncircumcised soldiers seems even more reasonable. Tears and abrasions of the foreskin itself are commonly seen on sick parade. Small abrasions of the delicate coronal membrane must be very common during brothel intercourse. Both provide a portal of entry for the spirochæte.

Army experience, in the light of the present results, leads one to the conclusion that the advantages of circumcision far outweigh the previously mentioned disadvantages. Frequent physical inspection of men reveals that cleanliness of these parts is commonly neglected. When bathing facilities are poor, neglect is almost universal. The area is then prone to infection. Venereal warts and balanitis are usually the result of such carelessness. Non-

specific penile ulceration, chancroid and syphilis often result from tears in a tight foreskin. The latter also renders diagnosis more difficult. It is concluded that the presence of a foreskin is a distinct liability to the average soldier.

SMALL TUMOURS OF THE SKIN*

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IN this paper I have included tumours both in the neoplastic sense and those the result of some inflammatory process giving rise to hyperplasia or hypertrophy of tissue. A study of the histology of the skin with its vascular, glandular, nervous and connective tissue elements will show the variety of proliferative processes which may occur. There are some sixty odd tumours of the skin and while many cannot be considered as small tumours I have decided to limit my remarks to some of those most commonly met with in everyday practice.

First among these I would mention those of congenital origin. The nevus as seen in a variety of forms, vascular, pigmented or non-pigmented, smooth or verrucous, local or general, is usually present at birth but may not appear for years. The hæmangioma or vascular nevus so often seen in early life, appearing as a small bright red elevation, may rapidly grow for several months, then may become stationary in size, increasing only in proportion to the growth of the child. They very often disappear spontaneously at adolescence, but unfortunately one is not able to tell just which ones will disappear.

Early treatment, meaning under two years, we believe the most satisfactory either by freezing with CO₂ snow, with treatments averaging 10 to 15 or 20 seconds, though 30 seconds for thick tumours is used. The initial treatment is restricted to five seconds freezing to determine sensitivity, as some react to an undesirable depth in freezing, even down to the underlying muscle.

Treatment by radiotherapy gives excellent results, particularly in the cavernous type.

Then there are the pigmented and non-pigmented nevi or moles, and the simple nevoid

pigment hypertrophies such as freckles and lentigines. All show a deepening in pigmentation on exposure to the sun. They are often distinguished by their possession of a few hairs. While not generally present at birth they are usually evident by the age of five. Some advance the theory that the nevus cell takes its origin from the basal cell by a process of gradual differentiation and may or may not contain pigment. Their surface is usually smooth and flat but is occasionally raised, with a verrucous or wrinkled surface, and they are nearly always soft.

In colour these nevi vary from slate blue to bluish black, or various shades of brown to jet black with lighter and darker shades often present in the same lesion. Everyone has one or more of them on his body and yet the occurrence of malignant melanoma is relatively very rare. Treatment of the common benign pigmented nevus depends on the location, the size and thickness of the lesion, and the presence or absence of hair. Surgical excision is unnecessary except where there is a suspicion of malignancy. Application of CO₂ snow may be effective, but we believe electrodesiccation cautiously employed to avoid scarring, to be the most satisfactory method. Benign lesions on the face and extremities subject to trauma are liable to undergo malignant change, and metastasis to lymph nodes occurs comparatively early. We have therefore recommended excision when these are found on examination, though they may have been present for years and the patient was unconcerned about them.

Sudden changes in colour, or increase in size, or inflammatory change should be regarded with suspicion and calls for immediate surgical intervention. The raised indurated lesion later bleeding and ulcerating is characteristic of the malignant melanoma. While the vast majority of these tumours originate from ectodermal tissues and are therefore melanocarcinomas, there are those conceded to be of mesodermal origin, the melanোসarcoma. However, owing to difficulties sometimes encountered in differentiation, I believe they now are all included under the classification of malignant melanoma. Wide surgical excision is we believe, the only satisfactory treatment, with a difference of opinion as to the value of heavy x-ray therapy following. The tendency to early metastasis and rapid spread makes malignant melanoma

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more dangerous than any other neoplastic growth.

Another of the tumours occasionally seen is the fibroma. It is a benign growth made up of connective tissue cells and fibres, varying in size from a pinhead to a child's head. They are usually soft but may be firm and of elastic consistence, the so-called fibroma durum. They may be flat, sessile or pedunculated. The areas most frequently affected are the female genitalia, the face and trunk. Size and weight with accompanying irritation and trauma may cause some break or change in the surface epithelium though they are usually covered with normal skin. The etiological basis underlying their appearance is as yet unknown. Diagnosis is readily confirmed by biopsy and excision is the best form of treatment.

Among the growths of infectious origin first and foremost is the common wart, *verruca vulgaris*, believed to be due to a virus. It is a circumscribed tumour characterized by hyperkeratosis and hypertrophy of the papillary processes of the corium. The lesions may be either solitary or multiple and are frequently seen on the fingers and hands. When located on the soles they are termed *verruca plantaris*. The juvenile type, the *verruca plana juvenilis*, is frequently seen in children and young women. In most cases they are multiple and grouped on the face, hands and forearms. They often disappear spontaneously. They are sometimes treated with hydrarg. protiodid, gr. 1/6 to 1/4 three or four times daily. Intolerance to the medication results in cramps and diarrhoea. We believe the treatment of choice is x-ray therapy particularly in large solitary or closely grouped lesions, or curettage followed by fulguration of the base. The venereal wart or *condyloma acuminatum* is seen usually in the anal and genital regions. It is the result of a proliferation of the squamous cell layer of the covering epithelium. As they are frequently seen in moist warm areas, there is some maceration and the tumours are usually moist, soft and present a reddened surface. In treatment various absorptive and drying powders such as Bi Sal and starch are beneficial. X-ray is probably a satisfactory therapeutic agent as these lesions are quite radio-sensitive. Recently 25% podophyllin in mineral oil has been used with considerable success. *Condyloma latum* a manifestation of syphilis is a flattened growth

found in the ano-genital region, is actually a syphilitic papule which has undergone exuberant growth due to the favouring moisture and warmth of its situation, and has no relation to verruca.

In the infectious group I should like to mention the *granuloma pyogenicum*. This tumour consists of a circumscribed mass of granulation tissue, sometimes pedunculated with a smooth or verrucous surface. It may be bathed in a sero-purulent exudate or covered with a brown-black hæmorrhagic crust, or showing a shallow ulcerated surface. It bleeds very readily. After attaining a certain size it remains stationary. X-ray is the treatment of choice.

A more rarely seen growth of infectious origin is *molluscum contagiosum*. It is of interest to relate that this was the first human dermatosis in which a filterable virus was demonstrated to be the causative agent. This small growth appears as a pin head to pea-sized nodule, with a flat surface and central umbilication from which a cheesy mass may be expressed. These growths are most frequently observed on the face (especially the eyelids), the neck and genitalia though they may be found on the trunk and extremities. They are more commonly seen in children and young adults but no age is immune. Dissemination is caused by autoinoculation after scratching. Treatment is simple and consists of cauterization of individual lesions using a dental burr dipped in trichloroacetic acid.

Next I mention the keratoses, which might be termed precancerous, however only insofar as cancer has developed in them more frequently than in other dermatoses. The senile keratosis is a wart-like, dark grey or brownish lesion very subject to malignant degeneration, and commonly associated with senile atrophy of the skin. It is usually found on areas of the body uncovered by clothing, such as forearms, hands, face and neck. Earliest indication of malignancy is an inflammatory surrounding appearance with formation of a scab which on removal leaves a sharply defined erosion. Observation with biopsy if there is suspicion of malignancy, with curettage and fulguration or CO₂ freezing of the very small lesions, is believed the most satisfactory therapy. The seborrhœic keratoses are round or oval sharply circumscribed elevations varying in size from a pea to a large coin, usually multiple and generally covered with a greasy

brownish or greyish black horny mass and presenting a velvety appearance. They are seen most commonly on the seborrhœic areas, namely the sternal or interscapular region and about the waist line, and more rarely on the face and back of the hands. They are generally treated with CO₂ snow with excellent results. Where there is evidence of malignancy it is generally of the basal cell type.

While there is no sharp dividing line between those growths with simple epithelial changes and those which are definitely malignant any dermatoses of long duration such as nevi, keratoses, and benign tumours, may undergo malignant change usually carcinomatous. Of the two types of cutaneous carcinoma commonly seen, the basal cell is the commonest. Metastasis does not occur early or easily in marked contrast to melanocarcinoma previously mentioned. A basal cell carcinoma arising on normal skin begins as a small shiny or scaly grey ivory yellow or yellowish red nodule. It may be either slightly elevated or retracted with a shiny pink or pearly surface often covered by a tiny scale or crust. There may be telangiectasis at the borders with a tendency to bleed on minimal injury, followed by repeated crusting and breaking down. As the growth tends to spread peripherally there is often a rolled appearance to the margin with a small central superficial scar. Its site of predilection is the face, particularly the temples, forehead, nose and eyelids, although the lesions may arise in any part of the body. At this stage there may be no clinical difference between basal cell and squamous cell carcinoma. With future advancement of the growth with invasion of the underlying tissues there is extensive ulceration—the rodent ulcer. This in its more extensive manifestations is fortunately rarely seen today owing to earlier diagnosis and improvement in treatment. Excision may be carried out but where cosmetic considerations may not permit, radium and x-rays give excellent results.

Squamous cell carcinoma is a more rapidly growing type and development frequently follows prolonged exposure to certain rays and chemical agents. May I mention here that arsenical keratoses seen on the soles and palms, the result of long-continued absorption of arsenic following the taking of Fowler's solution for psoriasis or other skin diseases. These

sometimes occur even after relatively small amounts have been taken over short periods, and Fowler's solution is one of the most prolific sources of arsenical keratoses. The marked hyperkeratotic stimulation and the resulting lesions are very subject to carcinomatous degeneration of the squamous cell type. The condition known as superficial benign epithelioma, actually carcinoma of an extremely low grade of malignancy, occurring chiefly on the trunk, is seldom seen in persons who do not give a history of taking arsenic in the trivalent form usually for psoriasis. Hydrocarbons, volatile or finely dispersed are commonly encountered in some industries and are definitely keratogenic, textile oils being the worst offenders. Workers with various motor oils, tar, coal and petroleum products, chimney sweeps, stokers in gas works, smelters, pitch and anthracene workers all show a high incidence of these malignant growths. In Australia the sun's rays are considered such an important etiological factor that keratoses on exposed areas are excised. Because of the great part played by external agents, the situations most often attacked are the face, backs and hands, and genitalia. The growth is particularly liable to start in those flexures where dust may collect for example side of the nose or ear. The juncture of the skin and mucous membrane of the lips is also a common site. While subject to ulceration, simulating a rodent ulcer, differentiation is made from a microscopical examination of a section of tissue or biopsy. All lesions suspected of malignancy should be subject to a biopsy for confirmation of the diagnosis. In this tumour the great mass consists of well-defined prickle cells with often central whorls of flattened keratinized cells. As secondary lymph node involvement does not occur early except in those rare examples of rapid deep spread, the outlook is generally excellent. Excision or radio-therapy gives the best results, subject to examination at three months' intervals for a year, and then at less frequent intervals for a further period of at least four years.

No mention has been made of such tumours as milium lymphangioma, xanthoma, keloids, epithelioma adenoides cysticum, adenoma, leukaemia and others, some of which are of negligible importance and others of considerable rarity.

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NUTRITION IN SURGERY*

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UNTIL relatively recently nutrition has been an aspect of medicine to which surgeons have paid but little attention. With the discovery of the fundamental importance of fluids and electrolytes, interest in this subject was aroused and it has been maintained by the demonstration of the vital part played by proteins and vitamins in the various reparative and defensive processes of the body. This interest is not confined to those dealing with the surgery of the gastrointestinal tract, for malnutrition is encountered in every field, being almost invariably present to a degree in the chronically ill and those who have undergone any major operation or have sustained any severe injury.

Evidence for this statement can be seen daily. It was observed by all those who dealt with battle casualties that even in men suffering apparently trivial wounds, there would be a considerable loss of weight and strength during the period following the trauma, and in those sustaining the more severe injuries such as abdominal and chest wounds and major compound fractures, the weight loss would be great and would not be made good for many months. In civilian practice the same situation prevails.

Chart A illustrates the weight curves of 20 cases undergoing herniotomy. These cases were kept in bed for 7 days postoperatively and were offered the ordinary ward diet. It will be seen that the average weight loss during the postoperative period was 6 lb., a not inconsiderable amount.

A more marked weight loss is seen in patients undergoing a more severe procedure, as shown in Chart B illustrating the weight curves of 8 patients following gastrectomy. An average weight loss of 10.2 lb. is important in a group of patients who are characteristically underweight to begin with.

CAUSE OF MALNUTRITION

While it may be true that there is such a thing as the "toxic destruction of protein"

found in cases suffering from sepsis, tumours and extensive injuries, it is a fact that the most important cause of malnutrition is starvation. This starvation may be due to one of two factors: (a) An inadequate intake of food, or (b) an excessive loss of essential tissue fluids in the presence of an otherwise adequate diet.

In the first instance the inadequate intake may be due either to the fact that insufficient food is offered to the patient (Stevenson and his co-workers¹ have shown that this is often

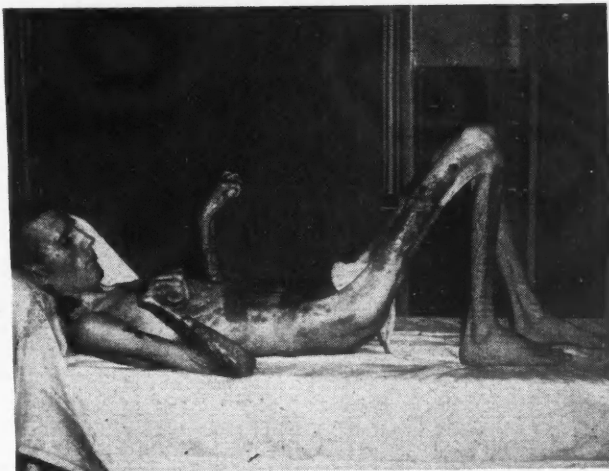


Fig. 1

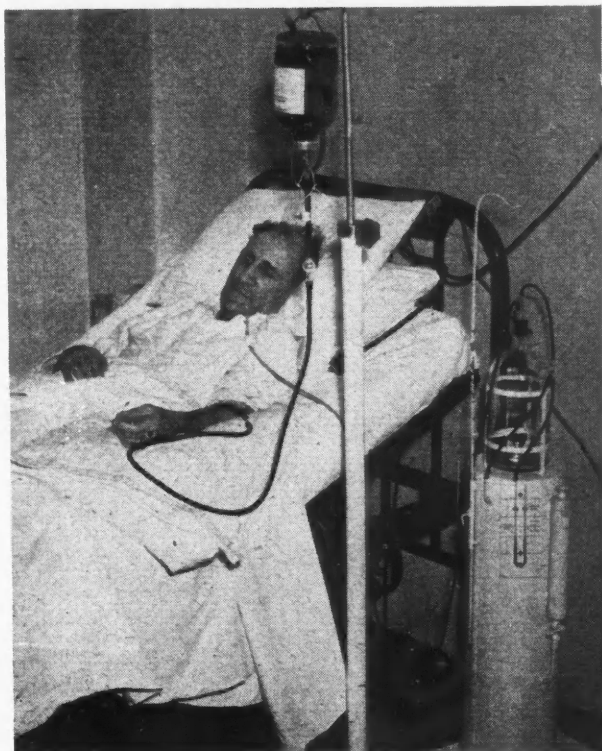


Fig. 2

* Read at the Seventy-seventh Annual Meeting of the Canadian Medical Association, Section of Surgery, Banff, Alberta, June 12, 1946.

the case) or to the fact that the patient does not eat all the food placed before him either because it is not to his taste or because he has no appetite.

In the second group the cause of malnutrition is also obvious. All tissue juices contain an abundance of substances high in food value and the loss sustained from a large burned area or by a severe diarrhoea or copious vomiting

may well be sufficient to produce gross depletion within a matter of hours.

The accompanying photographs are shown to illustrate two common methods of starvation—the one (Fig. 1) a patient losing large quantities of exudate daily and the other (Fig. 2) a patient following gastrectomy having his gastric contents removed and receiving an inadequate diet by vein.

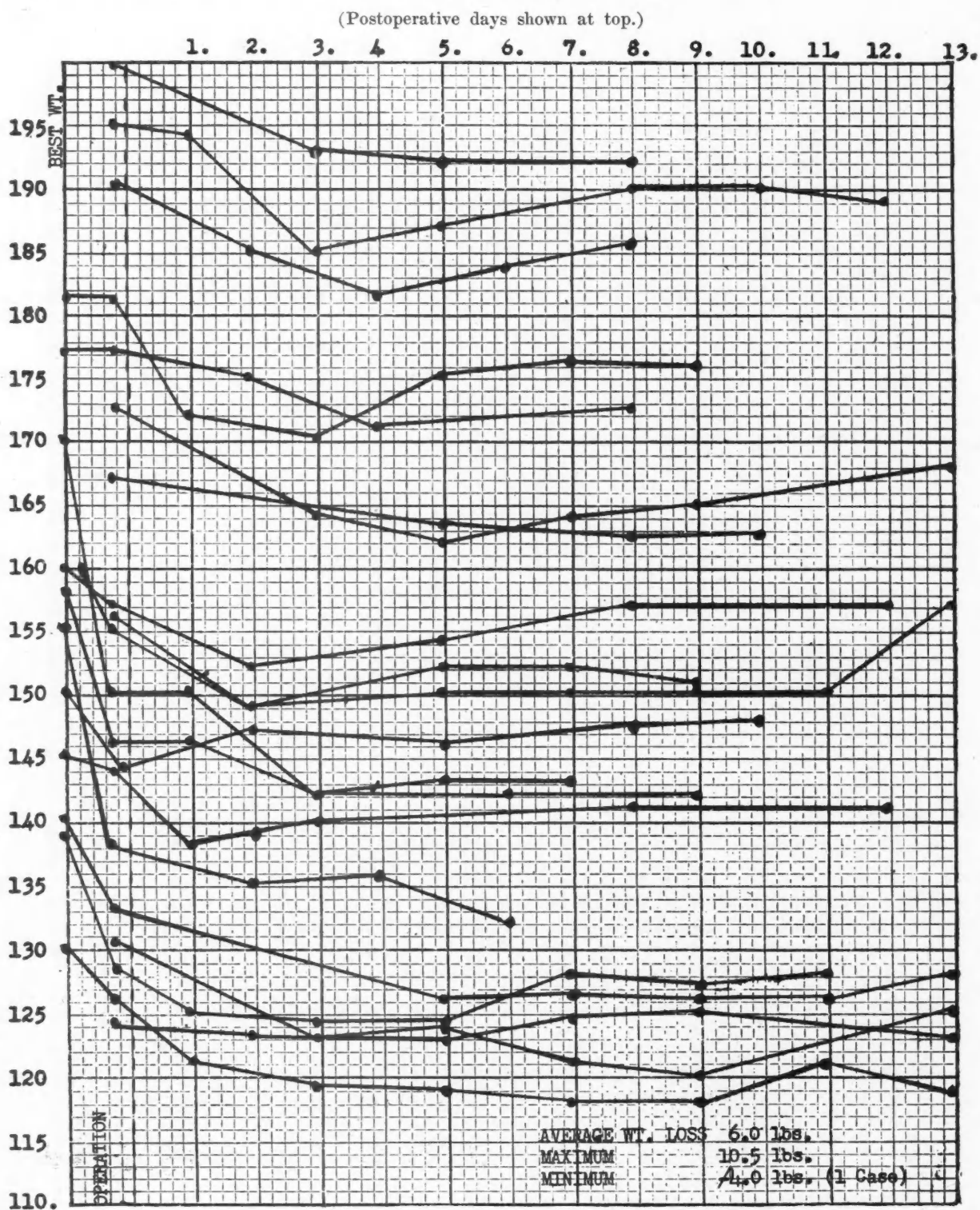


Chart A.—Twenty cases uncomplicated herniotomies kept in bed for 7 days.

EFFECTS OF MALNUTRITION

The symptoms of malnutrition are weakness, apathy and anorexia. An interesting measurement of the first symptom has been made by Co Tui, etc.² who carried out ergograph studies on a group of postoperative cases and found a progressive loss of strength during the period of starvation. They also showed that in another group of cases undergoing a similar procedure, but who were adequately fed, there

was no loss of strength, indicating that the weakness results from the starvation itself not from reaction to operation or to the fever or to any other factor that might be blamed.

Apathy, found so commonly in the seriously ill, is not measurable and it is not possible to say that it is due entirely to lack of nourishment though one has seen evidence to suggest that this is so. It is certainly true that when a patient's intake is increased to a level at

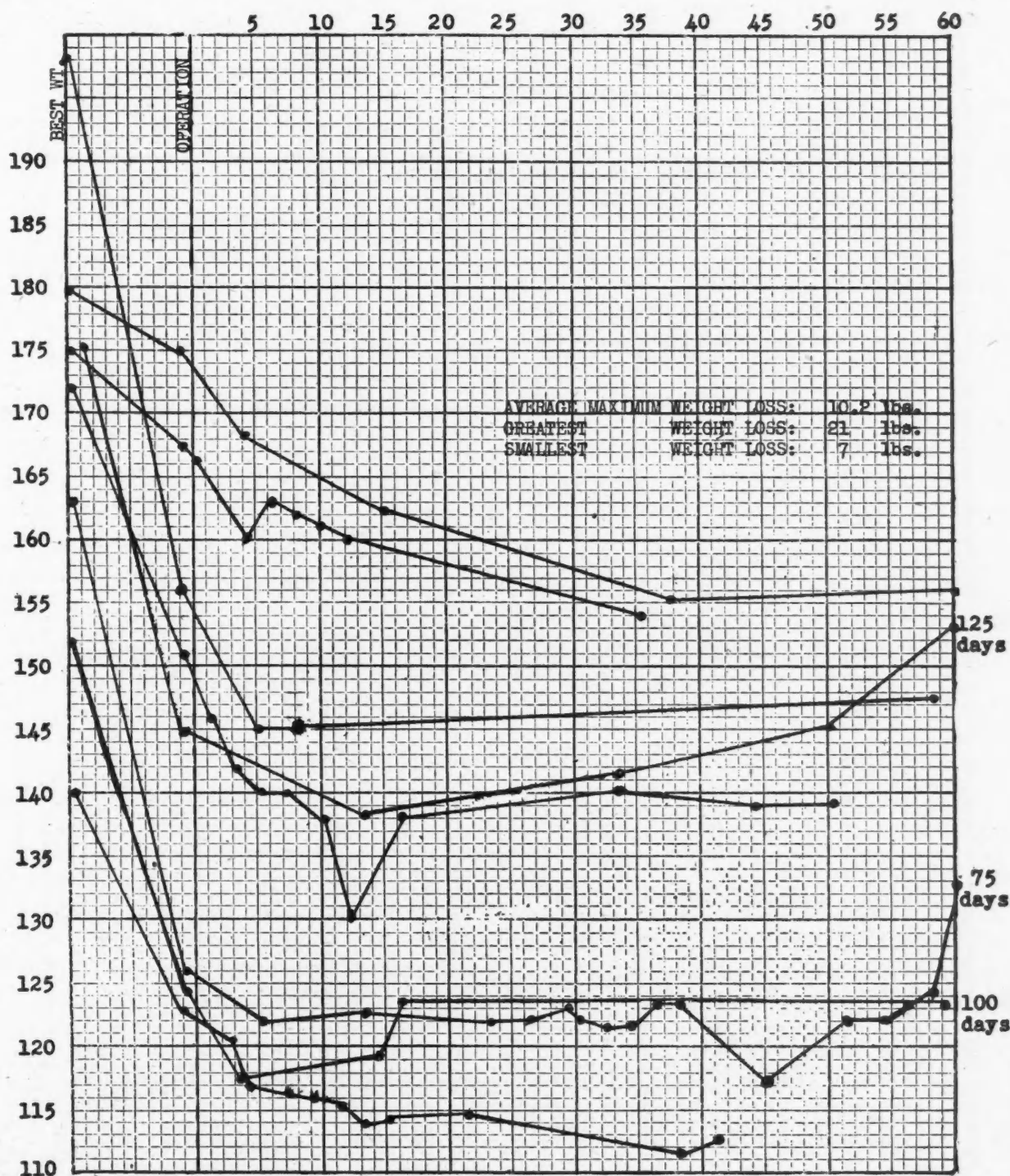


Chart B.—Weight curves in 8 uncomplicated gastrectomies for duodenal and gastric ulcers.

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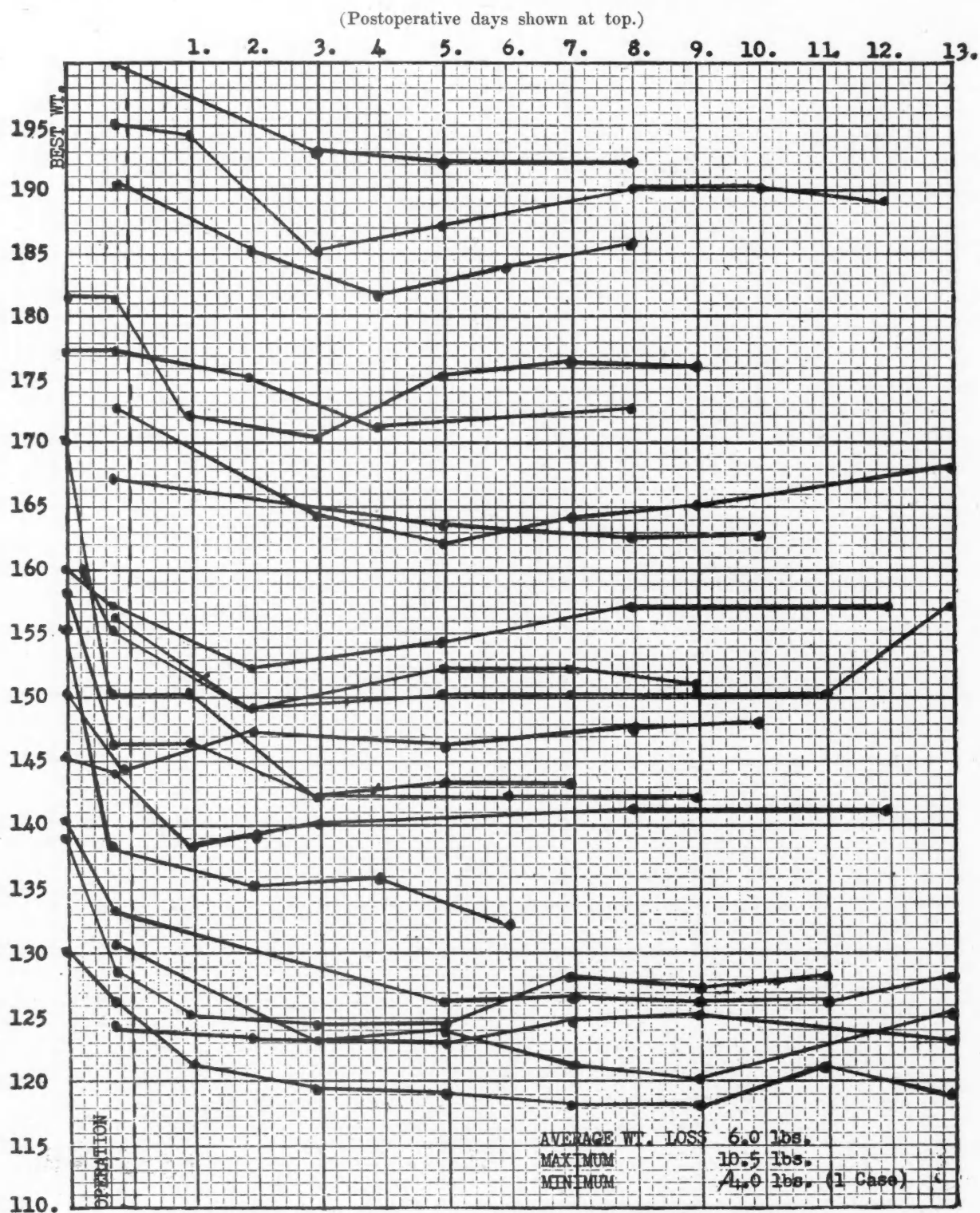


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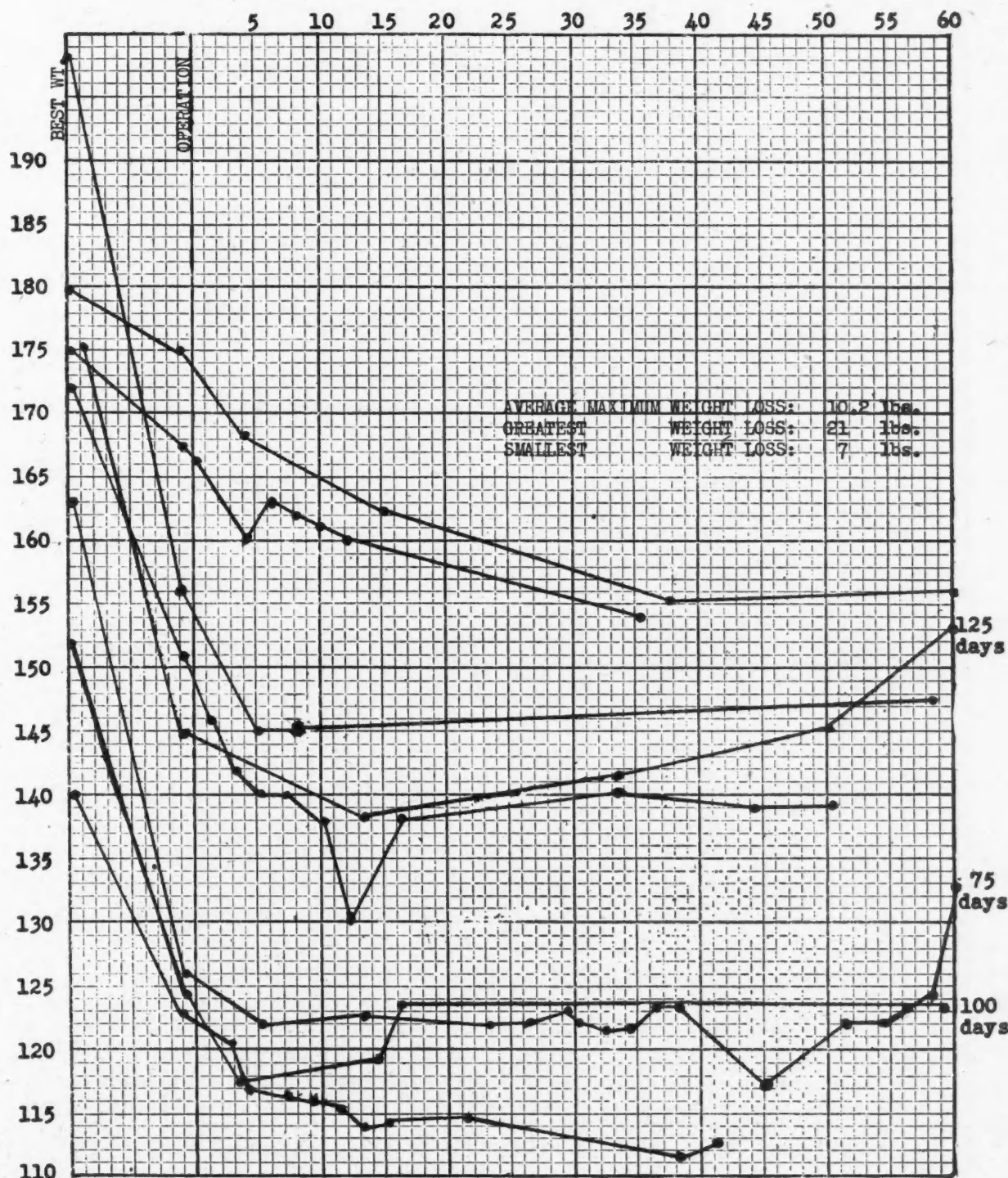


Chart B.—Weight curves in 8 uncomplicated gastrectomies for duodenal and gastric ulcers.

which he is gaining, his morale improves at once.

Anorexia is an invariable symptom, though it is not always recognized as such, and it is this fact which renders the management of these cases so difficult. If loss of appetite is regarded as a challenge to the doctor's ingenuity much will be done to correct it. If, on the other hand, it is accepted as an insurmountable difficulty, the case may well be lost.

The pathology of starvation is not clear cut, for the picture is so often clouded by associated disease, but certain points appear to be well established. There is a progressive loss of the body protein during starvation, at a rate of about 1 gram per kilogram of body weight daily. The ensuing hypoproteinemia will result in an oedema of the dependent subcutaneous tissues but will be present in the internal organs some considerable time before it is demonstrable externally. The oedema involving the brain, heart, lungs, liver, kidneys, etc. will result in decreased efficiency. Coupled with the hypovitaminosis which will inevitably develop, one finds that starved patients are more prone to infections, involving the wound itself or the lungs; show reduced resistance to already established infection; show delay in wound healing and return of strength; show reduced resistance to the toxins of anaesthesia.

ESTIMATE OF PATIENT'S STATE OF NUTRITION

At the present time there is no reliable method of estimating this aspect of a patient's condition; however, a fair opinion may be formed from the following data:

A. The general appearance—evidences of weight loss, dehydration, etc.

B. The comparison of the patient's present weight with his optimum weight.

C. The dietary history—an inquiry into the type and quantity of food that has been consumed by the patient during his illness.

D. History of vomiting, diarrhoea, wound exudate, etc.

E. Red blood cell count and haematocrit which are regarded as factors of considerable importance although not necessarily quantitative estimates of the nutritional state.

F. Plasma protein value, which may yield information of great importance but which may be misleading in that the total value does not necessarily indicate the general protein state of the body. For example, one may find, on the one hand, normal values in a patient who is grossly under-nourished (the burned patient whose picture is shown had a plasma protein value of 7.8 gm. per 100 c.c.) and on the other hand a low plasma protein in a patient who in all other respects appears well, or a falling value in a patient who is gaining weight and strength. The explanation of this may be found if differential protein values are determined, for it is probable that it is mainly the albumen fraction that

is decreased in malnutrition while the globulin and fibrinogen fractions may increase to maintain the total value at or near its normal level. In this same burned patient a differential protein analysis showed: albumen 3 gm., globulin 4.75 gm. with an A/G ratio of 1:1.5 compared to the normal of 2:1.

G. Vitamin estimates are not yet of any practical value. The levels or the activity of vitamin A, parts of the B complex, C and K can be measured, but in most instances (excepting vitamin K) the knowledge gained does not warrant the labour expended.

Let us now examine the methods of feeding and the substances available for administration by the various routes.

TABLE I.
BASIC REQUIREMENTS IN DIET

A. Fluids.....	2,000-3,000 c.c.
B. Electrolytes, ..	6 gm. NaCl
C. Proteins.....	90 gm.
D. Fat.....	112 gm.
E. CHO.....	400 gm.
F. Minerals....	
G. Vitamins....	Vit. A 4,000 I.U.; Thiamine, 2 mgm.; Riboflavin, 3 mgm.; Nicotinic acid, 20 mgm.; Vit. C, 75 mgm.; Vit. K, 2 mgm.

Oral—regular diet.—There is certainly no question that there is no perfect substitute for an ordinary diet taken in the ordinary way. There are, however, two points which must be re-emphasized.

One must be certain that the patient is offered an adequate diet. Stevenson and his co-workers in their excellent survey of nutrition in Canadian military hospitals showed that in many instances the diet actually offered to patients was very much less than had been ordered for them, a fact of which the medical officers in charge of the cases were entirely unaware. Furthermore these patients were not even eating all of the inadequate diet presented to them. Bearing these facts in mind and realizing that in all likelihood similar conditions prevail in civilian hospitals, one will readily see that it is worth while to check these matters carefully in all cases of importance.

In many cases it may be necessary to augment the ordinary diet by substances having a high food value in relatively small bulk. Many concentrated foods are available. The following examples are given as being useful for this purpose (Table II).

Amigen and nutramigen are commercially prepared protein digests of extremely high food value in a small volume. The taste of these substances is so deplorable that few patients will take them. It is said that a liking for them can be acquired, but this is not our

TABLE II.
SPECIAL DRINK—1 PINT

	Protein	Fat	Carbohydrates
3 eggs.....	18	18	
½ pint ice cream.....	12	36	60
6 tablespoons Casec.....	42		
3 tablespoons sugar.....			15
¾ cup whole milk.....	6	7.5	9
	78	61.5	84
Total calories per pint—1,201.5.			

CASEC DRINK

	Protein	Fat	Carbohydrates
3 tablespoons Casec....	21		
½ cup cream.....	4	22	8
2 cups milk.....	16	20	24
1/6 pint ice cream.....	4	12	20
1½ teaspoons sugar.....			8
1½ teaspoons syrup.....			5
	45	54	65
Total calories per pint—740 cal.			

experience. They have a place, nevertheless, for some patients can tolerate them and those who cannot take them by mouth, can be given them by tube if necessary.

Jejunostomy feedings.—These are essential in those patients who cannot take food by mouth and whose condition is such that they may not be maintained long enough on intravenous feedings.

Intravenous feedings.—In recent years the advances in intravenous therapy have been great. With the production of amino acids in a form suitable for intravenous administration and the popularization of whole blood and plasma for nutritional as well as resuscitative purposes, it is now possible to provide a diet by this route which comes within reasonable distance of being adequate. Recently Brunschwig and Bigelow³ reported a case in which they maintained a patient on intravenous feedings alone for 46 days and at the end of that period were able to perform a major abdominal

procedure with good result. They used amigen and glucose saline and whole blood—the latter being given only 5 times during this period. While this case is a most unusual one, it does show what can be done.

Table III includes the various substances that are available for intravenous administration together with figures showing their approximate food values. It will be noted that glucose saline, which for years has been the mainstay of intravenous therapy, is exceedingly low in food value and one can well understand why it is that patients receiving enough of this fluid to maintain their water balance should still become grossly undernourished. In the present day it is an unjustifiable error to place a patient on a regimen of say 3,000 c.c. 5% glucose in saline in a day even if it is proposed to continue this treatment for only 2 to 3 days. True enough his fluid requirements will be met, but that is all that can be said for the method. He will be receiving too much salt (about 26 gm.) which may be harmful, and he will not be getting nearly enough nourishment—a total of 600 calories made up entirely of carbohydrate, which is quite inadequate.

The following prescription is much more beneficial.

2,000 c.c. Amigen.
500 c.c. 10% glucose in saline.
500 c.c. 10% glucose in distilled water.
This provides 77 gm. protein, 300 gm. carbohydrate and about 8.5 gm. NaCl yielding about 1,500 calories.

We have considerable experience in the use of intravenous amigen and have found it valuable. The reactions have been few and none has been severe. It contains all the essential proteins in a concentration sufficient to supply an almost adequate amount of protein in the volume of fluid which the patient will require for his daily needs. That it does not fill all the requirements is obvious, for its caloric yield is low and though a patient receives his full quota of nitrogen by this means he will continue to lose weight because of the low caloric intake. It is regrettable that to date no satisfactory preparation of fat has been produced for universal use. When this is available it will be possible to maintain the nutrition of a patient by the parenteral route alone.

The nutritional values of whole blood and plasma have not as yet been determined for it is not definitely known whether or not the proteins that they contain are utilized. The

TABLE III.

	Per 1,000 c.c.				
	Protein	Fat	Carbo- hydrates	Salt	Calories
Intravenous:					
1. 5% glucose saline.....	0	0	50	9	200
2. Plasma.....	70?	?	?	?	280
3. Whole blood.....	141.5	?	?	?	566
4. Amigen.....	38.5	0	50	2	344
5. Parenamine..	..	..	..	..	..
6. Gelatine, is- inglass, gum acacia					

figures given above for these substances assume (perhaps incorrectly) that all the protein of the plasma and the protein of the hæmoglobin are utilized. It is probable that they are of distinct value and it is recommended that they be included in any long term program.

We have not had sufficient experience with parenamine to pass judgment on its efficacy and we have not used any of the colloids. We have no knowledge of prolonged intrasternal or subcutaneous feedings.

TUBE FEEDING

Tube feeding though seldom necessary has a definite place in the armamentarium. Of interest in this regard is the recent work of Mulholland and Co Tui on the use of the double lumen Abbott-Rawson tube following gastrectomy. One lumen, to which suction is applied, leads to the remaining gastric pouch. The other, through which a fluid diet is injected, passes through the stoma into the upper reaches of the jejunum. These workers have found that it is possible to maintain gastrectomized patients in positive nitrogen balance during their postoperative period and they have produced a group of patients who show an actual increase in weight and strength following this extensive operative procedure. Such results are highly commendable and one would do well to emulate them. Obviously in many types of cases this is impossible but in others, by one device or another, nutrition can be maintained. The Miller-Abbott tube may be used for feeding purposes in complicated cases, for example:

1. In those with high intestinal fistula, the Miller-Abbott tube may be passed beyond the fistula and feedings introduced through the tube.

2. Where there is an obstructive lesion in the distal small intestine, a Miller-Abbott tube can be passed down to the obstruction and suction maintained at this site. Meanwhile the patient can take a low residue diet by mouth and he will derive considerable benefit from it as it passes through the gut before being suctioned off.

Let us now examine how these principles may be applied to the various types of cases with which one is confronted:

1. The "routine" type of case—for example, the hernia, the patient with uncomplicated appendicitis or the simple fracture. To regard this type of case as a nutritional problem might

at first appear to be ridiculous. The mortality in this group is negligible and most surgeons are satisfied with the results that they achieve. We would submit, however, that it is important to treat these patients energetically, to keep them as active as possible consistent with their comfort and well being, to provide them with an adequate diet by one means or another without any unnecessary intermission, and our reasons are: (a) The period of convalescence will be shortened, resulting in a lowering in the number of hospital days and in the cost to the patient. (b) A reduction in the number of complications. (c) The fact that if at any time during the convalescence, a complication should arise the patient will be in a better position to overcome it.

2. The undernourished patient who presents himself for surgery. Examples of patients falling into this group would be those with chronic gastro-intestinal disease such as gastric or duodenal ulcer, carcinoma of the stomach or large bowel; patients with chronic infection such as pulmonary tuberculosis, osteomyelitis, etc. Here the initial problem is to render these patients as fit as possible for surgery and in this situation time is an important factor. In so many cases, adequate preparation cannot be carried out within a matter of days. So often one is inclined to give a transfusion or two and to order a high calorie diet for a few days with the quite unjustified feeling that all that can be done has been done. On careful inspection, it is obvious that such a condition cannot be reversed rapidly and one should be resigned to spend, in many cases, a matter of weeks of thoughtful and energetic management before the peak of condition is reached. The diet must be most carefully supervised and if necessary, other measures (transfusions of blood, plasma, amino acids) must be brought to bear upon the case. There is no doubt whatever that it is worth while to wait until the maximum benefit is attained.

3. The group of patients, who, following operation or injury, are seriously ill and who, if left to their own devices, will become nutritional problems. The objective in the management of these cases is to maintain their nutrition at as high a level as possible during the days when they either cannot or will not take a full diet and to make certain that when they do resume an ordinary diet they are provided with and actually consume enough food. Except

in special instances such as the tube feeding of postgastrectomy patients already mentioned, it is practically impossible to prevent a degree of weight and strength loss, but at the same time, every effort should be made to minimize this loss.

During the period when a patient is subsisting on intravenous feedings he should be given the greatest volume of the most nutritious fluids consistent with safety. When he starts to take fluids orally, these fluids should be of high food value and if he cannot take enough by mouth, supplementary intravenous feeding sufficient to satisfy his caloric requirements should be continued until he can take all he needs by mouth.

If such a regimen is followed, the effects of malnutrition will not become so marked as they otherwise would, the patient's strength will return to normal sooner and, what is more important, his condition at any time during his convalescence will be better than it would be were his diet left to chance.

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THE KUNTSCHER METHOD OF INTRAMEDULLARY PIN FIXATION*

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THE method about to be described was original with Kuntcher, a German surgeon of Friebourg. It was popularized at the Kiel German Naval Hospital and the first paper appeared in March, 1940. The method was to use axial intramedullary fixation by large cannulated stainless steel rods filling the cavity; and while at first considered anti-physiological, it gained certain popularity in central European countries. The observations which I would report were the result of several visits to the Clinic of Professor J. F. Nuboer in Utrecht. There I saw some 20 cases of a series of some 60 patient in which this method had been employed. The

findings and conclusions are remarkably close to those of Soeur¹ who has reported on 55 cases.

The method is essentially that of using an intramedullary pin for the fixation of fractures of the shafts of long bones. Many of the features resemble the technique of the Smith-Peterson pin fixation for the neck of the femur and in fact the basic surgical principle is the same in the two methods. The theoretical objection of the loss of marrow in one bone is known to be of little importance, and the danger of fat embolus has proved to be negligible.

The pins used are made of V2A Krupp steel. (Later pins made by Still in Sweden were used in Holland and Belgium. Down Brothers are in the process of making them now.)* They are of various sizes as the pin chosen for each case is selected on the basis of the width of the medullary canal and the length of the shaft it should pass through to hold all fragments. The pins are in sizes number 7, 8, 9, 10, 11 which is the actual diameter in millimetres of the pin. The size of pin to be used is accurately measured by taking an x-ray of the fractured bone at one metre distance from the x-ray tube; then the actual width of the medullary canal can be directly measured on the plate. The next

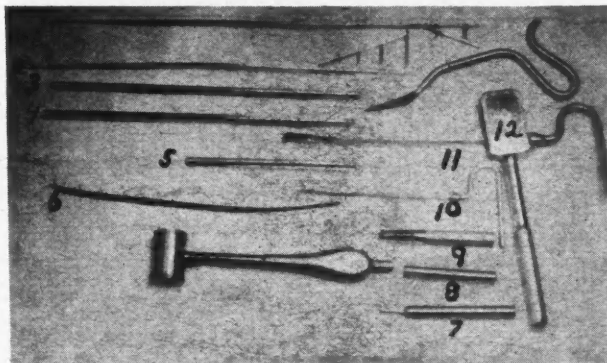


Fig. 1.—Special instruments for Kuntcher pin insertion.

size smaller pin is selected so that it may just pass without difficulty through the medullary canal. For adult femurs No. 8 is the usual size. The pin then is 8 to 9 mm. in diameter and may be of varying length from 12 to 24 inches depending on the case. In cross section it is "U" shaped (with longitudinal flutings to prevent rotation) the centre being the tunnel which carries the pin over the wire guide which is first inserted. The pins for femurs are abso-

* Presented at the 66th Annual Meeting of the Ontario Medical Association, May 23, 1946.

* Meanwhile, it has been possible to duplicate the pin of Kuntcher, and these will be available for use. (R.K.M.)

lutely straight (3, 4, 5 Fig. 1). Those for tibias are slightly curved and "V" shaped in cross section, and are inserted from an oblique groove in the upper end of the tibia into the medullary canal, and then traverse the medullary cavity to its lower end. More recently split pins for tibias have been introduced so that the split lower ends flare out into the wider lower end of the medulla.

In addition to a considerable selection of pins for the various cases to be treated, there are some other special instruments, (Fig. 1). The first is a heavy wire guide with a handle at one end and sharp point at the other and about two feet long (1, 2, Fig. 1). It is about 3 mm. in diameter and rigid enough to stand hammering. It is introduced from the top of the femur by tapping and by boring action with the handle until it is in the medullary canal, and then it is passed across the fracture line. There are several punches, hollow ones and ones with recessed ends used for hammering the last part of the pin over the guide, and for driving the pin home into the bone without burying it (7, 8, 9, Fig. 1). There is a special hook that engages in a hole which is in the top end of each pin for its removal (10, 11, Fig. 1). And there is a split fork-shaped hammer that will hammer against the handle of the hook to tap out the pin in its removal (12, Fig. 1).

SELECTION OF CASES

The ideal case for the method is the transverse fracture of the middle of the shaft of the femur. After that fractures in the upper third, then tibia upper and mid-shaft, and occasionally the humerus. It is not so applicable to cases of the lower third of femur or lower tibia, as the medullary cavity widens out and the fixation is not so satisfactory. It is of considerable value in cases of pseudarthroses. It may be combined with bone grafts where bone defects of considerable size are present. It is unsuitable for grossly comminuted fractures, and for young people. It has been used from the age of twelve years. It may be contra-indicated in compound fractures.

FEMORAL REDUCTION

Prof. Nuboer has made his own traction table which can be attached to any operating table. It is on the principle of the Hawley table, but as the patient is operated upon in the case of the femur lying on the side with the fractured femur uppermost and with the hips flexed, there is instead of a central perineal post for counter traction, a post that is vertical in front of the symphysis pubis. And in addition a perineal padded band is used which fastened to the upper end of the table gives counter traction. The traction is then applied to both the uppermost and the underneath limb by a

method similar to that employed in the Hawley table. The foot pieces have universal joints and screw traction is employed. The extension bars are adjustable in length and also may swing in an arc on the operating room floor to give the desired flexion to either hip. A photograph of the table with the patient in position is shown (Fig. 2).

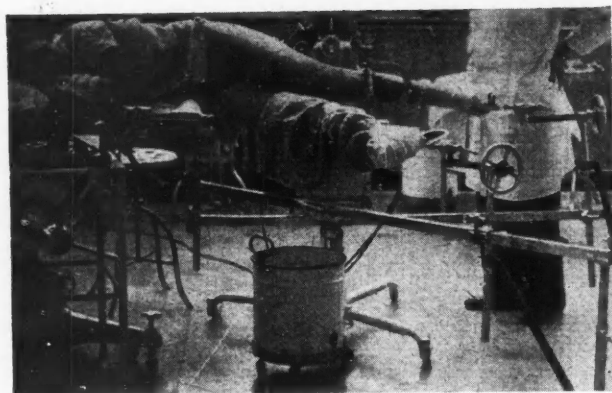


Fig. 2.—Position on the table for the insertion of a Kuntscher pin in the left femur.

The actual reduction is done by manipulation of an assistant under fluoroscopic control in two planes while the traction is adjusted. As the operator has the intramedullary guide down to the fracture site he is ready to tap it across the fracture line into the medulla of the lower fragment. Closed reduction and insertion of the guide followed by the pin from a small incision over the upper end of the femur is the end to be desired, but if it is impossible to achieve satisfactory reduction in this way due to interposition of soft parts, or callus or loose fragments, open operation at the fracture site and open reduction are resorted to.

The steps of the procedure for a femoral pin will be described as witnessed. The patient was a 32-year old female student of Amsterdam University who had sustained a simple slightly oblique fracture of the mid-shaft of the left femur three days before the operation. She was given epidural block anaesthesia which is the routine and which is preferred at the clinic to spinal anaesthesia. The patient was placed on the table in position lying on the right side with hips flexed and with traction and counter-traction as described. Preparation and draping over the limb with portable x-ray units in two planes and head fluoroscope in position was on similar lines to that employed in the Smith-Peterson pin technique. The operator stood at the patient's back, level with the up-

permost hip as she lay on her side. A two inch skin incision was made over the upper end of the greater trochanter of the left femur and the cortical bone exposed, just to the inner side of the overhanging ledge of the great trochanter at the junction of trochanter and neck. The sharp pointed guide was engaged in the cortex and tapped with a mallet to pierce the cortical bone. Two or three times it slipped off the outside and went down the lateral surface of the trochanter before it was accurately placed and engaged in the cortical bone. It was then advanced by a combination of tapping and boring motion along the medullary canal until the fluoroscopist announced that it was at the fracture line. The intramedullary position of the guide was verified by the feel and sound of the boring very much as it may be sensed in the neck of the femur.

This is the critical point in the procedure. At this point the assistant with the aid of the fluoroscope attempts to line the lower fragment with the upper. And the operator attempts to pass the guide into the medullary canal of the lower fragment by tapping it with the mallet. Eight such attempts were made before failure was admitted and the closed reduction abandoned. This had taken 25 minutes from the commencement of the operation.

Open reduction was then done and in five minutes the fracture site was exposed and a spike of bone freed from muscle it had penetrated, and the guide was passed well down into the lower fragment. The 8 mm. pin of suitable length was then driven over the guide from the upper end of the femur. It was a tight fit for the small medullary canal and required forceful blows of the mallet. When the upper end of the pin was down to the handle of the guide a hollow punch was used over the guide to advance the pin; and when the end of the nail was nearing the cortex the guide was removed and a punch with a half-inch recess in the end was fitted over the pin like a cup to drive it home but to leave the hole for removal outside the cortex. The guide had been removed by using the hook and forked hammer straddling the shaft of the hook and hammering against the handle of the hook. The wounds were closed. The post reduction x-rays showed 100% anatomical reduction and alignment. No external splinting was applied. There was absolutely no shock to this

procedure and at the end of the operation we saw patients able to lift themselves up on the balkan frame and assist themselves into the bed.

Postoperative management.—The patient is encouraged to move about the bed and bend the hip and knee in two or three days after the operation. Cases that are suitable such as transverse fractures in the middle third are all allowed to walk in 2 to 3 weeks with crutches, in 6 weeks with two canes, others when the x-rays show adequate callus formation.

This procedure is associated with an unusually large fusiform callus formation at the fracture site which is almost characteristic of the operation. It is unusually large and in all the x-ray plates attracts immediate attention. It is believed to be due to the pin which in passing down the medulla may squeeze out marrow substance about the fractured ends like tooth paste, and this marrow substance may be responsible for the large callus formation which occurs in both the open and the closed reductions. Other theories are that it is due to the foreign body reaction or to intramedullary pressure. This callus also appears earlier than usual and is seen in the x-rays in 2 to 3 weeks in most cases (Case 3, Figs. 11 and 12). This may be due to the fact that the procedure is one of impaction as opposed to traction in which we know the appearance of callus is delayed.

The pin is removed in three or four months or at later periods in pseudarthroses. Three pins that had been in varying periods were removed on one day of our visit. Because of shortage of pins they were removed as early as possible in order that they might be available for other cases, but at times the patient is well and busy and does not return for removal until it is convenient.

Removal is effected by a small incision over the site of insertion. The end of the pin is usually covered by a bursa formation or even a thin shell of bone. The hole in the pin is cleared, the hook attached and with the forked hammer it is hammered out. The pin on removal shows little or no evidence of rusting. It is usually withdrawn without forceful blows. In some cases it is firmly fixed, in others it is lightly held.

Insertion of tibial pins.—Epidural block is again used. The knee of the affected side is elevated on a support. The sterile screen is interposed between the operator standing at the

knee with skin draping, and the assistant who manipulates the lower leg under the fluoroscope on the other side of the sterile screen. Through a two inch incision over the upper inner surface of the tibia a hole is made in the bone $\frac{1}{2}$ " by $1\frac{1}{2}$ " in size with the chisel or gouge. This opening is then made oblique so that the curved tibia pin may be started obliquely with the longitudinal concavity forward, and the groove open posteriorly. There is a handle fitted to the end of the pin and this is hammered as the pin advances down the medullary canal. In the case of the tibia no guide is used. When the

CASE REPORTS

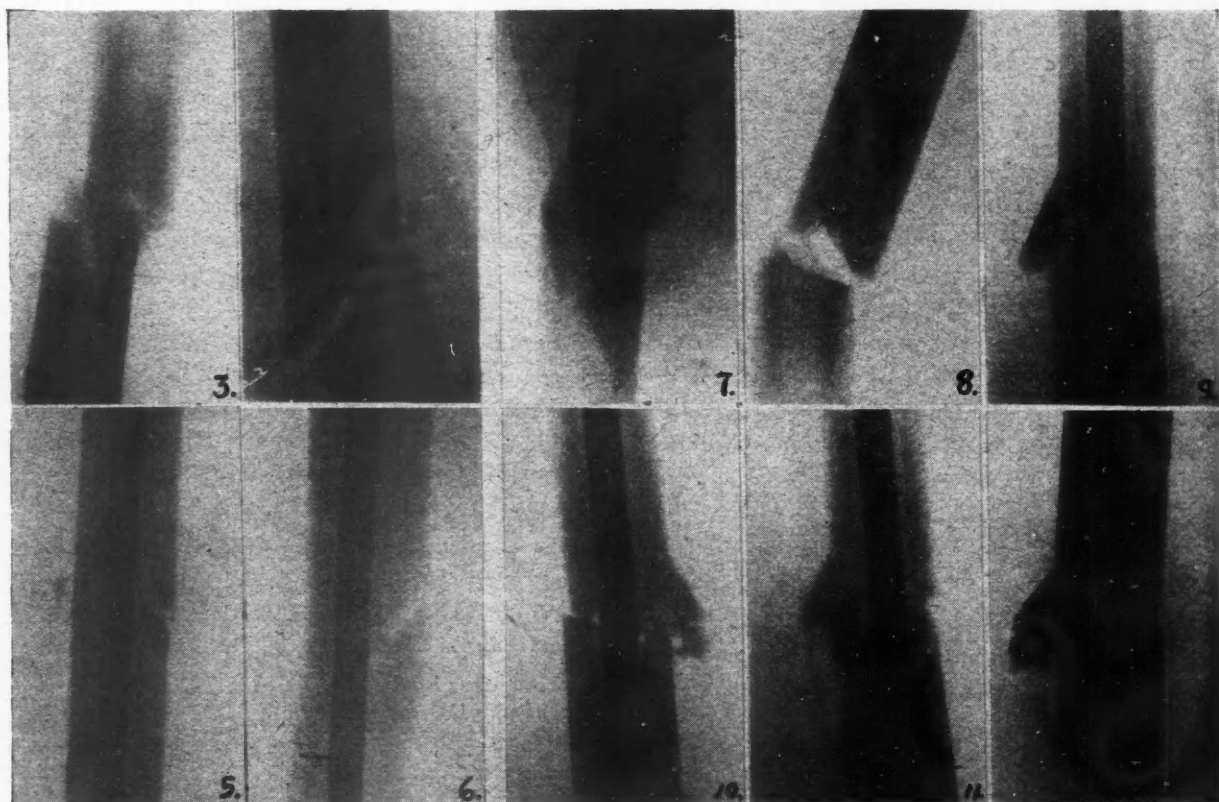
The following cases are taken from a series of 15.

CASE 1

Female, aged 23 years. Transverse fracture shaft left femur November 17, 1945. Insertion Kuntscher pin November 22. Figs. 3 and 4 before and 5 and 6 after pin insertion.

CASE 3

Male, aged 32 years. Transverse fracture femur November 1, 1945 (Figs. 7 and 8). Kuntscher pin November 6 (Figs. 9 and 10). Seen walking well with crutches and with knee flexion 90 degrees and showing early callus (Figs. 11 and 12) on November 20, 1945.

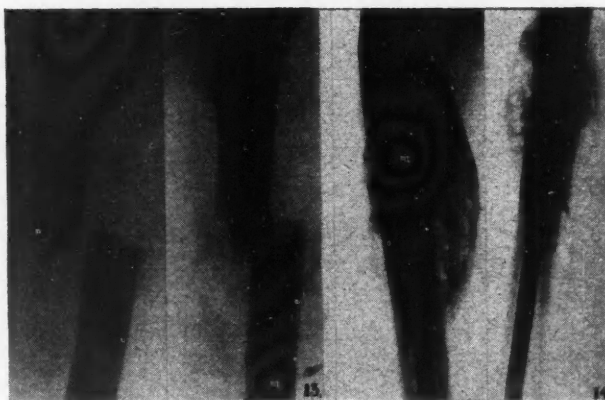


Case 1

Case 3

fracture line is reached the assistant attempts to reduce the fracture so that the pin may enter the medullary canal of the lower fragment.

Difficulties in reduction may be encountered and several attempts have to be made before reduction is satisfactory and the pin located in the lower fragment. A soft metal slab is placed under the pin and over the soft tissues to prevent impingement of the pin on the soft tissues. Tibial pins are measured for length but are all of the same diameter. Tibial fractures are best held with a plaster from thigh to toes in addition to the pin to prevent rotation.



Case 5

CASE 5

Female, aged 22 years. Fracture of pelvis, concussion, transverse fractures of upper ends of both femurs May 3, 1944. X-ray May 25 (Fig. 13). Kuntscher pins inserted in both femurs May 26. X-ray August 31 (Fig. 14). Seen for pin removal November 21, 1945 with good functional result.

CASE 6

Male with delayed union of a fracture of lower third of tibia in which it was difficult to obtain closed reduction because of the callus and the pin inserted only caught the cortex of the lower fragment. However, with a plaster and walking he had obtained bony union.

CASE 7

Male, aged 27 years. Oblique fracture of middle of right femur August 7, 1945, Kuntscher pin inserted by open operation. In three weeks x-ray showed callus and in two and a half months he was back at work in his store and when seen by me November 12, 1945 he had 100% function.

CASE 10

Male, aged 20 years. Bilateral transverse fracture of tibia March, 1942. March, 1943, had pseudarthrosis and bone grafts held by 4 wires. Kuntscher pin May 15, 1944. Patient walked six months in plaster and six months without plaster and obtained union by bone. A small sinus is present with no sequestra to be seen.

CASE 11

Male, aged 28 years. Oblique fracture lower third tibia which at six months had delayed union. Pin was inserted and he was allowed to walk in plaster. Without plaster he could not have walked as with the wide medulla of the lower end a single pin does not give adequate fixation. Again, as the fracture was oblique without the pin he also could not have walked.

CASE 13

Male, aged 23 years. Fracture right tibia and fibula August 11, 1944. Kuntscher pin August 15, 1944. On August 23, out of hospital walking with plaster. On October 20, started back to work. On November 22, when seen he had full function and was playing rugby and tennis.

CASE 14

Nurse, aged 19 years, with fragilitas ossium. Comminuted fracture of left humerus November 5, 1943. On March 11, 1944, x-ray showed delayed union. On March 13, tibial Kuntscher pin inserted in humerus. On May 31, 1944, all fractures solidly healed. On June 1, pin removed. When seen November, 1945, she had normal function.

Soeur also reports a number of cases in which this method was used in the humerus, when this pin was introduced from the upper end; and in the ulna, introduced from the olecranon; and in the radius, introduced from the lower end and dorsal surface. He concludes that it is suitable for all closed fractures of the humerus and that it is simpler and gentler than closed reduction in the forearm and preferable to plates.

The first case in America in which this method has been employed so far as we know was a man of 43 years of age. In 1936 he had fractured the middle of the right femur and after three months traction as well as plating of the frac-

ture had failed, he had had a bone graft. This had united but in November, 1945, he had fallen down two steps and re-fractured at the same site in the right femur. He had Kirschner wire traction from November to January and then a plaster spica. But on removal of the plaster spica in March he had clinical and radiological non-union. On April 11 Dr. R. I. Harris operated on this patient. The fracture site was exposed and the sclerosed medullary cavity was drilled out of both fragments with a large drill. The guide was then passed up the medulla of the upper fragment to come out at the top of the greater trochanter. The skin was incised here and the Kuntscher nail was passed over the guide and driven down to the fracture line and then into the lower fragment. Cancellous bone grafts from ilium were packed around the fracture site and the fragments impacted. A body spica was applied. The fragments were held firmly in anatomical alignment. His course was uneventful and he was discharged from hospital on April 29.

It was felt that the employment of this method in this case had produced results which were superior to those that would have resulted from any other method that might have been employed.

DISCUSSION

The principle involved is identical with that employed in the Smith-Peterson pin and if we accept the one we should be prepared to accept, in principle, the other. There is little shock and minimum disturbance to soft tissues, even in open reduction where the soft tissues do not need to be cleared back with stripping of the periosteum as in plate or screw fixation. With this method, when reduction is effected the job is practically finished, whereas in most other methods of internal fixation the difficulties have just commenced. The early exuberant callus, whatever its cause, is a welcome result since it takes place in fractures at the locations where the surgeon dreads pseudarthroses.

Infection is a possibility as in any open reduction, but if compound fractures are not included it is no more to be feared and indeed may be less likely. No cases of extensive osteomyelitis are reported. The cases seen were done without the protection of penicillin and prove that even without this protection infection need not be a serious risk. R. K. Ghormley² com-

menting on the use of "gadgets" in orthopaedic surgery states "The development of chemotherapy has made the use of various devices for internal fixation of fracture safer, so that many will be emboldened to increase the number of operations in which such devices are used." Occasionally the pin may be broken. Ring sequestræ have been seen. No cases of fat embolism have been reported.

One disadvantage observed was the exposure to radiation that the assistant received in the manipulation of the closed reduction. This hazard would have to be reduced to safe limits and indeed there is no reason why this may not be accomplished by resorting to the open operation in those cases not readily reduced by closed methods.

In the most carefully selected cases there was no question that the reduction was as complete and maintained more effectively than by any other method we have seen. In closed fractures of the middle and upper third of the femur it would appear to have advantages over any previous method. The special table, instruments, x-ray equipment, and selection of pins as well as the team work in technique make it a method applicable only in centres dealing with a large number of fractures. The accurate reduction, the adequate immobilization, the early restoration of function, are all desiderata of the fundamental principles of the treatment of fractures and with the curtailment of hospitalization will make a strong appeal for its use in selected cases.

SUMMARY

A critical study of the technique of the Kuntscher method of intramedullary pin fixation of fractures has been made. A number of cases so treated have been reviewed. Even granting that they were selected good results one is forced to conclude that the method has the advantages of adequately maintaining anatomical reduction while permitting an almost full function. It appears to have inherent features that promote unusually early and large callus formation and strong bone healing. This may be related to the impaction of fragments as opposed to traction in other methods. The technique is more detailed than difficult. There appear to be no specific disadvantages not associated with other methods of internal fixation or open reduction of fractures. This method would appear to have a place in the treatment of a specially

selected group of fractures in any centre where sufficient numbers of such cases are treated.

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CASE REPORTS

HYPERTROPHIC SECONDARY PULMONARY OSTEOARTHROPATHY (MARIE'S SYNDROME)

J. H. Duncan, M.D.*

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The patient came under observation about a year before he died. He was a six foot Polish labourer of fifty years but looking younger, lean but strongly built. His complaint referred to certain indefinite pains in his legs especially in his knees. The medicine prescribed seemed to help him and he kept coming back for more. His command of English was insufficient to furnish a complete history but I knew that he did not stop working, and I also was aware that there had been some family trouble that was said to be due to his bad temper. His wife and family had left him.

I wondered at the size of his hands and heavy bones. Out of curiosity I took an x-ray and found the surprising condition of all his long bones being enclosed in an outer layer of periosteal bone. After syphilis was ruled out by



Fig. 1

Fig. 2

repeated Wassermann tests which were negative, the condition seemed to fit exactly into the fol-

* We regret to record the death of Dr. Duncan since the receipt of his paper.

lowing description of Marie's syndrome in Osler's Medicine:

"A symmetrical enlargement of the bones of the hands and feet and of the distal ends of the long bones occurring in association with certain chronic diseases particularly affections of the lungs."

On his next visit a chest film was taken showing a large dense shadow extending out from the hilus of the left lung, having the appearance of a tumour of the lung.

The skull was normal, and several urinalyses failed to show albumen, sugar or pus. The only noteworthy finding in his blood was a fourfold increase of serum alkaline phosphates.

Repeated examinations of his heart failed to show anything unusual until two months before his death. He was at work and was brought into the plant medical office in a state of collapse, with auricular fibrillation and dependent oedema. With rest in hospital he improved and was discharged, only to return in a few days with progressive heart failure, massive oedema of the legs and later patches of gangrene scattered from the hips to the toes.

An autopsy showed a chronic bilateral adhesive pleurisy and a large papillary adenocarcinoma of the left lung which microscopically resembled prostate tissue.

A CASE OF HYPERTROPHIC OSTEOARTHROPATHY*

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A patient in hospital under observation developed, in a comparatively short time, all of the classical features of hypertrophic osteoarthropathy. A unique opportunity for the study of the development and progression of this unusual condition was thus afforded. The primary lesion proved to be a mediastinal tumour. Clubbing of the fingers, soft tissue hypertrophy of the distal portions of the extremities, and characteristic changes in the long bones, became unusually marked within the short period of one month. X-ray studies over a subsequent period of nine months were possible and clearly demonstrate the rapidity with which extensive bony changes may occur in this disorder.

* From the Montreal Military Hospital, Medical Division.

The patient was a 57-year old German prisoner of war. On first admission (April 17, 1945) he complained of swelling of the ankles, cough with sputum, pain in the ankles and knees while walking, and pain in the right wrist. The past history included an incident of trauma to the right chest in August, 1944, but was otherwise negative. He has made an uneventful recovery from this and there were no residual symptoms. In the family history it is stated that his mother died of visceral carcinomatosis. The presenting complaints had begun in January, 1945, and although they were not markedly severe in character had been persistent throughout the four months prior to admission. On physical examination the only positive findings were a few râles at both lung bases, and a slight pitting oedema over the ankles. These symptoms and signs were in some measure suggestive of cardiac disease, but noticeably absent were a history of dyspnoea with effort and any sign of venous congestion.

X-ray of the chest revealed the heart to be of normal size. There was no evidence of congestive failure. But the presence of "a well defined area of increased density of approximately four centimetres in diameter adjacent to the right hilum and suggestive of a huge gland or tumour" was discovered. The blood picture, except for a markedly elevated sedimentation rate, was normal (Hgb. 83%, leucocytes 10,900, sedimentation rate 88 mm. in the first hour). The blood Wassermann was negative. An x-ray of the right wrist was taken on April 25, 1945. The wrist joint was normal, but there were "irregularities of contour and thickening of the periosteum on the lower end of the radius" (Fig. 1).

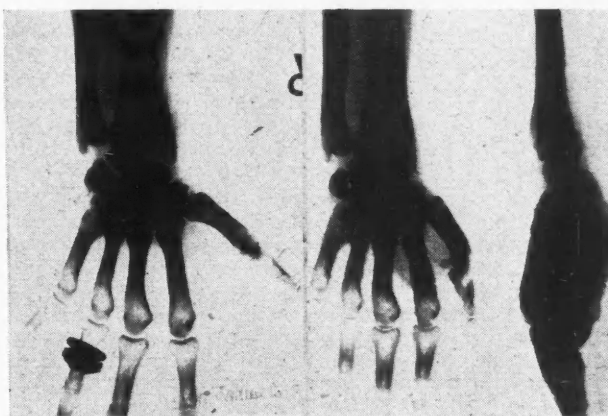


Fig. 1

Fig. 2

Fig. 1.—X-ray film of the right hand, April 25, 1945. The picture is relatively normal but for slight irregularities of contour and thickening over the lower end of the radius—early hypertrophic osteoarthropathy.

Fig. 2.—X-ray film of the right hand, December 27, 1945. A heavy layer of new formed subperiosteal bone envelopes the distal end of the radius and ulna. The wrist joint is normal. There is marked irregular subperiosteal proliferation evident along the shafts of all of the metacarpals and all of the proximal and middle phalanges.

This in association with the pulmonary lesion was interpreted as early evidence of hypertrophic osteoarthropathy. Clubbing of the fingers was not evident at this time but developed shortly thereafter and within a month was quite pronounced.

In June, 1945, it was decided that he should be repatriated and he was discharged from hospital. Repatriation proved impracticable, however, on other than medical grounds, and he was readmitted early in July, 1945 for further observation and x-ray therapy.

On his second admission his complaints were essentially the same but the swelling of his hands and feet was much increased and the fingers and toes were markedly clubbed. An x-ray of the chest at this time

showed that there had been some increase in the size of the mediastinal lesion. On close study the appearance was suggestive of a bronchogenic carcinoma or a chronic granuloma. The sedimentation rate was 99 mm. in the first hour. The blood Wassermann was again negative. A course of deep x-ray therapy to the chest was given. Following this the patient improved symptomatically and both the patient and the attending physician noted a diminution in the clubbing and the soft tissue swelling of the extremities. After a further period of observation he was discharged August 10.

He was readmitted on December 18. At this time his complaints were cough with occasional blood-streaked sputum, loss of weight, 10 pounds, swelling of the hands and feet, pain in the wrists, ankles and knees, and muscular weakness. The upper extremities exhibited marked clubbing of the fingers, unusual soft tissue hypertrophy of the hands, and an increase in the diameters of the wrists which was so marked that the usual tapering character of the forearm was entirely masked. (The diameter of the right thumb at the terminal phalanx was 8 cm., the diameter of the right hand at knuckles, 22.9 cm., and of the right wrist at the head of the ulna, 20.3 cm.) The clubbing of the fingers was further emphasized by large recurved finger nails. The base of the nail was hyperæmic, the palms were thickened.

The lower extremities presented a similar picture. There was marked clubbing of the toes and the soft tissue hypertrophy of the feet and ankles was pronounced. (The diameter of the terminal phalanx of the right great toe was 10.1 cm., and of the right foot opposite the head of the fifth metatarsal 25 cm., and of the right ankle at the medial malleolus 29.4 cm.) The heart, lungs, abdomen, and external genitalia were normal on physical examination at this time. The prostate was normal on rectal examination. There was no evidence of central nervous system disease. It was particularly noted that there was no cyanosis and no other evidence on physical examination to suggest peripheral anoxia.

The chest x-ray picture was relatively unchanged. X-ray of the bones of the extremities at this time provided a gauge to the progression of the osteoarthropathy. It is usually stated that marked bony changes do not develop until after the primary disease has been active for two or three years. The changes found at this time were therefore somewhat surprising. All of the bones of the upper and lower extremities showed marked changes with the exception of the bones of the shoulder and pelvic girdles and the terminal phalanges and the small bones of the ankle and wrist. A comparison of the x-ray picture of the right hand at this time (Fig. 2) with that taken at the time of the first admission eight months previously (Fig. 1) illustrates the marked degree of subperiosteal proliferation which had taken place. Similar changes had occurred in the lower extremities.

The laboratory investigation revealed the following: Hgb. 89%; leucocytes 8,000; sedimentation rate 64 mm. in the first hour, sustained sedimentation rate 50 mm. in the first hour; blood calcium 10.8 mgm. %; blood inorganic phosphorus 3.85 mgm. %; blood alkaline phosphatase 4.23 Bodansky units; blood acid phosphatase 1.35 Bodansky units; total plasma proteins 8.19 gm. % (albumen 5.87 gm., globulin 2.23 gm.); blood cholesterol 210 mgm. %; basal metabolic rate plus 13; vital capacity 3 litres. A glucose tolerance curve showed evidence of a slightly decreased glucose tolerance. The blood sugar values in milligrams percent were as follows: fasting 114; $\frac{1}{2}$ hr. 189; 1 hr. 196 (trace of sugar in the urine); 2 hr. 171; 3 hr. 72. On routine ward diet there was no glycosuria.

HISTORICAL FEATURES

The occurrence of soft tissue and bony changes in the extremities in association with pulmonary and cardiac disease was first recog-

nized by Bamberger in 1889.¹ In 1890, Marie² presented several cases with a descriptive accuracy which has not since been excelled, and suggested that this condition be called "pulmonary hypertrophic osteoarthropathy". That it occurs in visceral disease other than pulmonary is now clearly established and it is therefore referred to as hypertrophic osteoarthropathy. Locke³ in 1915 made a notable contribution to the clinical study and pointed out that simple clubbing, which is much more common, is in essence an early form of hypertrophic osteoarthropathy. Mendlowitz⁴ in 1942 made an extensive survey of the literature.

ETIOLOGY

Hypertrophic osteoarthropathy may occur at any age. It is much more common in males. It is, with possible rare exceptions, always secondary, the primary disorder being some chronic affection of the viscera. Changes are seldom, if ever, associated with disease outside the thoracic or abdominal cavities. The visceral lesion is usually pulmonary (bronchiectasis, empyema, tuberculosis, and neoplasm being the commonest lesions) but may be cardiac, hepatic, or gastro-intestinal. The typical lesions have occurred in association with all types of pulmonary disease—septic, toxic, degenerative, neoplastic, or lesions causing merely mechanical irritation of the lungs or pleura. Congenital heart disease with cyanosis, or subacute bacterial endocarditis are the commonest primary cardiac disorders. Congenital heart disease without cyanosis will not produce the changes. Chronic hypertrophic biliary cirrhosis has been reported as the primary condition in several cases. The full picture may also develop when splenomegaly and hepatomegaly due to chronic disease (*e.g.*, malaria or amyloidosis) coexist. Cases are also reported in association with chronic gastro-intestinal disorders characterized by severe diarrhoea or vomiting, *e.g.*, chronic ulcerative colitis or chronic pyloric obstruction.

The underlying mechanism in the production of these unusual bony and soft tissue changes in such widely varied conditions is not yet understood.

COMMENT

The present case conforms in detail with the classical description of hypertrophic osteoarthropathy as first presented by Marie. The

marked clubbing, soft tissue changes, large nails with hyperæmic nail beds ("une coloration rose foncée assez manifeste"), deep palmar creases, and enlarged wrists, with comparable changes in the lower extremities, are all typical. The case was somewhat unusual, however, in the manner in which the secondary changes developed and the rapidity with which they progressed. As a rule clubbing of the fingers develops as an early manifestation and bony changes occur subsequently. Bony changes do not usually become pronounced until after two to three years. In the present case early bony changes were discovered before there was clinical evidence of clubbing and in eight months the bony changes were widespread and very pronounced.

It is also surprising that the primary disease appeared clinically to be virtually quiescent throughout. The patient complained of a mild chronic cough and occasional blood streaked sputum but there was little or no other evidence of chest disease. Nor can the unusual rapidity with which the secondary features progressed be related to any apparent exacerbation of the pulmonary disease. Throughout the eight months during which widespread subperiosteal changes were taking place, he was entirely afebrile. The mediastinal mass did not appear to increase appreciably in size. There was a ten pound loss of weight but otherwise the patient's general condition appeared good. The vital capacity was three litres—somewhat diminished but adequate. There was no evidence of peripheral anoxia. From the investigation there did not appear to be any appreciable alteration in general metabolism. It is also difficult to explain in any way the mechanism of the development of the osteoarthropathy in this case. The absence of any evidence of anoxia has been referred to above. The patient did not appear to be suffering from chronic toxæmia. It can only be said that in some way a disease process affecting the viscera was demonstrating its existence by these unusual peripheral (somatic) manifestations; that this is a viscerosomatic condition.

SUMMARY

A patient with a mediastinal tumour developed all of the classical features of hypertrophic osteoarthropathy while under observation in hospital. It was thus possible to follow the development and progression of this unusual condition. The

rapidity with which soft tissue and pronounced bony changes occurred; the fact that bony changes preceded clubbing; the apparent quiescence of the primary disease during the period in which widespread very marked secondary changes occurred; these were the unusual, particular features of this individual case. There was no apparent explanation for the causal relationship between the primary disease and the secondary manifestations.

I would like to thank Lieut.-Col. G. W. Halpenny, Chief of Medicine, and Major W. Gill, Chief of the X-ray Department for their kind advice and co-operation in the preparation of this paper.

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BENADRYL IN TREATMENT OF MUCOSAL RESPIRATORY SYNDROME

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This syndrome (Stevens-Johnson disease) has been described under various titles including ulcerative stomatitis, muco-cutaneous fever, etc. It is essentially a severe prostrating illness with superficial, painful ulcerative lesions of the mucosa of the mouth and genitalia, conjunctivitis, coryza, pulmonary inflammation and occasionally skin eruptions. There is usually a prodromal period before the onset of the stomatitis which progresses with lightning-like rapidity; also there is a considerable tendency to recurrence. Chemotherapy has had no apparent effect on the course of the disease; blood transfusions have been noted to effect a favourable response in some cases; but to date no specific therapy has been reported.

The sudden and rather widespread mucosal involvement suggested to me that the syndrome might be due to an allergy or hypersensitivity. With this in mind it was decided to try the effect of benadryl on the following case.

An office clerk, male, aged 34 years, gave a past history of having been hospitalized for 19 days in 1938 because of a similar condition to his present one. Hospital records gave the following information: sore throat, slight cough, some malaise one week, when on September 15, 1938, he noticed blisters in the mouth, later the same day there were blisters on the penis and scrotum.

Admitted to hospital September 16, very ill; temperature 103.6° F.; conjunctivitis; lips and tongue thickened

and oedematous; vesicles and ulceration of the lips and buccal mucosa plus a greyish white membrane in the mouth, on the tongue, pharynx and tonsils. There were similar lesions on the penis and scrotum with a white discharge on the glans penis; crepitations were heard in the right chest at the base.

Laboratory findings on admission were: leucocytes 25,150, 74% polymorphonuclears, 16% lymphocytes, 7% monocytes, 2% eosinophils, 1% basophils, haemoglobin 99%, erythrocytes 5,500,000. Blood Wassermann negative, blood culture negative, urine negative, smear from throat showed mixed organisms, culture *Staph. aureus* and non-haemolytic streptococcus.

He was treated with prontosil intramuscularly, prontosil orally, and remained very ill for six or seven days when he slowly improved, temperature fell by lysis until it was normal on October 2, and he was discharged home on October 4, recovered, but with a phimosis.

The patient is unmarried, has no known family history of allergy, nor of a similar disease and has no history of other allergic phenomena. He had since remained well until the present episode which is described briefly as follows: Went to bed August 30, 1946, with fever, cough and backache; thought it was "flu", recovered, went to work September 2. Ate supper September 3, at 5.00 p.m. when he noticed his throat to be slightly sore. At 8.00 p.m., the throat was worse, gums began to ache and felt swollen, swallowing was painful. About midnight blisters were forming in his mouth, at 1.00 a.m. September 4, eyes began to water, penis began to itch and burn, mouth was worse, increasing cough. At 2.30 a.m., September 4, admitted to hospital. At 3.00 a.m. started on penicillin 15,000 units intramuscularly, q. 3 h. At 10.00 a.m., anus was itchy and burning.

I first saw the patient at 12.00 noon, September 4. Temperature 99°, pulse 88, respirations 24. He looked rather apprehensive, complained of feeling very weak, was a somewhat ashen grey colour, considerable conjunctival injection and oedema with a serous discharge, nasal mucosa red and oedematous, lips swollen, numerous vesicles on buccal, gingival, palatal, faucial and lingual mucosa up to 5 mm. in diameter, intervening mucosa covered with a greyish white membrane and there were a few small superficial mucosal ulcers; several teeth were carious; similar lesions were noted on the glans penis. There was no urethral discharge. The anus was tender and the mucosa possibly oedematous but no ulcers were seen. There were a few inspiratory and expiratory rhonchi heard throughout the chest with some post-tussive râles in right base posteriorly. No skin lesions.

Urine was negative, haemoglobin 102%, red blood cells 4,190,000, leucocytes 9,050, polymorphonuclears 69%, lymphocytes 29%, monocytes 1%, basophils 1%. Culture from lesions in mouth later showed streptococci and staphylococci, negative for K.L.B.

At noon on September 4, he was given 100 mgm. benadryl orally, to be repeated twice more that day and thereafter 100 mgm. t.i.d. During the afternoon the patient noticed no change. On the morning of September 5, the anal itch and irritation had disappeared and his eyes felt better. On examination his eyes looked improved, many more of the vesicles in his mouth had ulcerated, and the mouth looked worse, but the patient said his mouth was feeling a little easier but that he could not chew nor swallow.

The lesions on his penis were beginning to ulcerate, there were no rhonchi in the chest, there were still a few post tussive râles in right base, the cough was less severe. That night the penile irritation ceased. From then on there was steady improvement. Benadryl was reduced to 50 mgm. t.i.d. on September 9, and the patient was discharged. He returned to work at once and has been well since.

Although one cannot draw definite conclusions from a single case, the amazingly rapid recovery in six days from a disease which usually requires two to six weeks hospitalization suggests that

benadryl may have been responsible and warrants further trial of this drug in future cases. It is felt that the penicillin had no bearing on the response as it has produced no noticeable results in the past but was continued here with the hope that it might be helpful in preventing any severe pulmonary complications from secondary infection.

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GANGRENOUS OVARIAN CYST IN A CHILD OF FOUR, AND RUPTURE OF THE HEART

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The two following cases are thought worthy of record.

CASE 1

G., a child of four, of Anglo-Saxon parentage, was in excellent health and with no history indicating abdominal disease until August 1, 1944, when she complained of distress high in the abdomen, became nauseated and vomited bile-stained fluid.

There was emesis at intervals on the next day, and some disturbance though to less extent on the third day. On August 4 she was apparently well, ate normally and had a natural bowel movement that was normal in appearance. She cried with pain a good deal that night, and would accept only fluids next day. She vomited again this day. Seen on August 5, the child was lying down, but very contented, smiling, and talking freely, taking light fluids freely but not wanting food. She said she had no pain. Examination was negative except for slight resistance in the right mid-rectus area. No objection was made to deep palpation here, or elsewhere and no mass or resistance was found, temperature 100.8, pulse 96. Rectal examination was not made.

On the 6th the report was another bad night, at intervals crying with abdominal pain. Seen in forenoon, the temperature was 99.4°, and there was some definite resistance in the region of the right mid-rectus. The child stated she felt well, had no pain, but did not want food.

She was taking light fluids freely. Admitted to hospital in the forenoon.

On admission the temperature was 101.2°, pulse 114. White blood cells 20,300, polymorphonuclears 73%. Five hours later white blood cells 23,000, polymorphonuclears 83%. Laparotomy in the afternoon showed the following: The subcutaneous fat was unusually yellow. There was some free intraperitoneal fluid. The appendix was found disappearing downwards to the left pelvis, moored and buried in adhesions that extended across the whole pelvis. Appendectomy was done. The appendix itself was inflamed, probably from external contacts.

Exploration of the pelvic adhesions showed a gangrenous cyst of the left ovary, with two complete rotations in its pedicle. This gangrenous mass was removed. It was 8 centimetres in diameter and contained fragments of seven teeth, bone and sebaceous material. No trace of remaining ovarian tissue was recognized in the left pelvis. The right ovary showed no suggestion of cystic formation.

The abdomen was closed without drainage. Recovery was uncomplicated, and patient went home on August 16.

CASE 2

K., aged 70, male, white. This patient was first seen in the night of January 3, 1946, complaining that he had been unable to lie down to sleep for a week as he then could not get his breath. This had followed a flu attack. Previously he had lived for years in an isolated northern district, and had not consulted a doctor. He had suffered with transient attacks of asthma.

On examination he was found to be short of breath. There were signs of slight bronchitis; the heart left border was inside the nipple line in the 5th interspace, rate about 96. There was an aortic systolic blurring. Systolic blood pressure approximately 140 though he was definitely arteriosclerotic. He was given digitalis and heroin, and slept well in a low Fowler position. No medication was given after the second day. He slept later on a level bed and was discharged on the fourth day. The blood pressure was then 244/98.

He was seen once three days later, feeling well, and had no cough. He stated he was leaving

the city in a few days and promised to go under medical care at once on arrival at his future home. Between then and February 5, it is stated that he had remained in the city, that he was continuously and actively about, though not working, that he smoked a great deal and coughed a great deal. On February 5 he returned to his home about 5.00 p.m., complaining of desperate distress in the chest, and stating he had a terrible time getting home; did not know how he got there. He would not sit down, but kept walking constantly to and fro. Becoming steadily worse, he was sent to hospital by taxi, arriving about 6.30 p.m.

On arrival he was dyspnoeic, cyanotic and had a fast, irregular pulse. He was coughing and perspiring profusely. He was put to bed on a double-inclined plane, and oxygen was started. When I saw him about 7.00 p.m. he was semi-conscious, suffering acute air hunger, absolutely drenched in perspiration and with an irregular pulse of about 180. The oxygen was increased and digitalis 1/100 and heroin 1/6 was given intramuscularly. In about 15 to 20 minutes the breathing was quiet, the pulse down to about 100, and he went to sleep. Heroin 1/12 was given at midnight and at 8.00 a.m.

He slept fairly well. In the morning he seemed brighter but did not speak or attempt reply. In the afternoon he did not apparently recognize his family. He had a fair night again, heroin 1/12 being required approximately q. 8 h. for dyspnoea and restlessness throughout this period. He was conscious this second morning, recognizing me, answering in short sentences but tending to mentally wander. The blood pressure was 116/84. The heart rate was steady. During the forenoon dyspnoea steadily increased, sphincter control failed, the pulse became more rapid, the respirations were rapid and irregular. Death occurred at about 4.45 p.m., presumably about 49 hours after the onset of the acute intrathoracic distress.

Autopsy performed by Dr. L. McLatchie showed the myocardium to be moderately filled with fluid blood. There were two tears in the lower part of the left ventricle, one about 3/16" long, the other 3/8". These lay in the floors of adjoining sulci separated by the insertions of chorda tendinae. The ruptures were directly through, not dissecting laterally. The cardiac wall in all this area was extremely thin.

SPECIAL ARTICLE

AMINO ACIDS*

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The indications are, that the amino acids will have increasingly important uses in the pharmaceutical field, primarily because they are of fundamental importance to the human and other organisms. They have this fundamental importance partly because they are molecular bricks of the proteins. There is no class of substance more intimately associated with the central processes of life than the proteins. Master hormones, antibodies, and enzymes are certainly proteins. The genes, which many feel must figure importantly in a type of preventive medicine of the future,[†] are almost certainly proteins.⁵ Viruses, hæmoglobin, membranes, muscle—even hair, skin, and nails are proteins. The proteins are the building stuff of the body. They are also the agents that do the building, and that maintain the repairs. The substances which, in the laboratory, come closest to having the power of self-reproduction, are proteins.^{5, 6} The proteins in turn are essentially large molecular combinations of amino acids. This is the fundamental reason for the interest in amino acids.

PREPARATION OF AMINO ACIDS

The amino acids which have been recognized as constituents of protein are almost two dozen in number. The earliest methods for their preparation depended largely upon hydrolysis, or chemical digestion of proteins. Synthesis has been relied on increasingly for preparative purposes. Methods of manufacture must be selected on the basis of the specific purpose in mind. One very important criterion related to such selection is based on the fact that amino acid molecules are capable of existence in two forms, a left-handed and a right-handed form. This relationship is quite analogous to the relationship between left-handed and right-handed gloves. It is a significant fact that amino acids which are found in nature are almost exclusively left-handed or *levo*; the right-handed or *dextro* type is practically absent from protein. The human organism is capable of using only the *levo* form of many of the amino acids. When amino acids are isolated from

protein by hydrolysis with acids or enzymes, they are of the desired *levo* form. When they are prepared by total synthesis they consist of exactly equal amounts of the *levo* and *dextro* forms. The latter are usually undesirable, which frequently means that synthesis has an inherent disadvantage. It is, however, possible to synthesize two pounds of some amino acids more cheaply than to isolate one pound, and subsequently to employ two pounds of synthetic amino acid even though only one-half of it is active.

On one hand, cheaper methods of synthesis are continually being developed, on the other, isolation procedures are also undergoing improvement. When new proteins with unexpectedly high contents of certain amino acids are found, the costs of these amino acids are of course lowered. This sort of knowledge develops especially from systematic study of proteinaceous by-products; fish processing fractions, for instance, have yielded pleasingly large quantities of some amino acids, such as arginine. It is interesting to note that the cheapest amino acid, glutamic acid, which is obtained from protein, is available in quantity at less than one dollar per pound. The simplest amino acid to synthesize, aminoacetic acid, is on the market at over twice as much. Some of the sources of isolated amino acids seem also to be capable of improvement by crop breeding, somewhat as are other characteristics like acreage yield, and blight resistance. In co-operation with the United States Department of Agriculture, we are carrying out in our laboratories in Iowa a project for increasing by breeding the contents of lysine, tryptophan, and other amino acids in corn.⁸ In accordance with the belief that it is unsafe to predict whether synthesis or isolation will eventually provide the most economical methods of production for individual amino acids, we are also attempting to develop better syntheses of lysine and tryptophan. It is, however, our intention to follow up the breeding possibilities for each amino acid which may be of commercial value.

One reason for the interest associated with increase of lysine and tryptophan in corn is closely related to what has been the principal concern of the pharmaceutical industry in amino acids—as a therapeutic form of protein nutrition.

A little history of this subject may be in order. The tissue proteins are constantly wearing away and need to be replaced by fresh protein. In the normal human being, replacement of tissue proteins is accomplished after digestion of food protein in the stomach and intestines. The resultant amino acids and small combination of amino acid molecules, which are called peptides, are carried to various sites and are synthesized into the particular tissue, hormone, or other protein required. When there occurs in the digestive apparatus an ab-

* An address delivered to the Thirty-ninth Annual Meeting of the American Pharmaceutical Manufacturers' Association at Lake Louise, Canada, on June 10, 1946.

† This is already true in the breeding of poultry which is resistant to disease (1), and in the breeding of disease-resistant plants (2). Cf. also (3) for a discussion relating the gene and eugenics, and (4) for a reported inheritance of resistance to malaria in humans.

normal condition such as intestinal obstruction, peritonitis, peptic ulcer, carcinoma, or non-function due to near-starvation it is desirable to bypass the usual digestive "disassembly line". Proteins such as casein and egg albumen which we get in normal food cannot be injected directly into the blood stream because they will produce serious reactions.

Human blood proteins can be injected but they are quite expensive. One answer to this problem is to introduce into the blood the building units which are normally there after a meal, and which are normally employed for the purpose—amino acids and peptides.

These principles were appreciated by Abderhalden over 35 years ago. Abderhalden and co-workers,⁴ in one of their experiments hydrolyzed a quantity of beef, in the presence of enzymes from the gastrointestinal tract. The patient was one Konrad Gegner, a 12-year old boy who had drunk the contents of a glass of lye. The lye induced a stricture of Konrad's oesophagus which finally prevented his taking food by mouth.

From September 1 to September 15, 1909, Abderhalden's hydrolyzate was administered to Konrad by rectum. During this period the patient retained nitrogen and actually gained a little weight. Abderhalden had demonstrated that human protein nutrition could be effected by non-oral administration of pre-digested protein. This seems to be the first record of protein hydrolyzate utilization by a human patient.

Abderhalden also realized that in his mixture some of the amino acids were critical. If tryptophan were destroyed, for instance, the resulting mixture was not properly retained by dogs. It was not until 26 years later in 1935, when pure individual amino acids had become available in sufficient quantity that McCoy, Meyer, and Rose,¹⁰ working with rats, determined just which amino acids are critical. Today eight amino acids are known to be required simultaneously in order that any of them be properly retained by adults. These eight are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, and valine. These eight are known as essential or indispensable amino acids. The word "essential", in this connection, is not always interpreted in the manner originally intended. Many of the amino acids which are not called essential are actually indispensable to life. For instance, thyroxine, the amino acid which is substantially the active principle of the thyroid gland, is one without which we could not live. The body is capable, however, of making thyroxine from phenylalanine, a so-called "essential" amino acid. "Essential" in this connection thus means that the amino acid is required but cannot be synthesized by the body rapidly enough; it must be included in the diet. It is furthermore true that for over-all protein nutrition, a minimum

amount of each of the eight essential amino acids must be present in the mixture.

Nor is this the whole story. Many investigators have observed that completely hydrolyzed protein is not equivalent in nutritional value to the original whole protein. It has recently been announced by Sprince and Woolley¹¹ that many proteins liberate on proper partial hydrolysis a factor (strepogenin) which enhances the value of amino acid mixtures in nutrition. Strepogenin is not an amino acid itself; it appears to be a peptide intermediate between protein and amino acids. When added to mixtures of the amino acids, streptogenin increases their value to mice and rats. When the streptogenin effect has been adequately evaluated, the use of synthetic amino acids for protein nutrition will be closer at hand.

A reason sometimes quoted for the rising interest in amino acids is the belief that they will have a history similar to that of the vitamins. There are similarities and there are differences. One important difference is in the amounts required. Spectacular cures of vitamin deficiency diseases are achieved with milligram amounts of vitamins. The necessary daily intake of amino acids is, however, several hundred times, in weight, that of the vitamins required.

Much work is going on in an attempt to determine specific amino acid deficiency states comparable to those for vitamins. This field can be expected to move ahead with the aid of the new microbiological assay methods of Max Dunn and others.¹² Interest in individual amino acids is, however, not restricted to their use in treating deficiency states. Some examples follow.

The largest market which exists for a single amino acid is undoubtedly that for glutamic acid. The relatively pure monosodium salt of glutamic acid has been used in the Orient for about thirty years as a meat flavour, and provides a considerable industry there. In the last decade monosodium glutamate has become popular in the United States. The resultant large-scale manufacture partly explains the low cost of this amino acid.

Glutamic acid, because of its basic amino group, combines with hydrochloric acid to provide a source of hydrochloric acid in which the strong acidity of the latter is masked. Glutamic acid hydrochloride therefore is used as a therapeutic agent for the introduction of gastric hydrochloric acid.¹³

Glutamine is a glutamic acid derivative which has the natural function of detoxifying some mildly poisonous molecules and is therefore of interest in this connection.

Glutamic acid, because of its low price especially, is also of potential value as a chemical intermediate. In our laboratory we have been able to synthesize plant hormones and

weed-killers of an otherwise expensive type from glutamic acid, and it appears that it will be more feasible to obtain a new series of compounds in this family.¹⁴

Glutamic acid thus presents accomplished and potential utilities as an industrially useful material, as a chemical intermediate, as a biochemical intermediate, and as a pharmaceutical agent. These utilities plus perhaps that of curing deficiency states, represent some of the chief ways in which individual amino acids are likely to develop markets.

Another amino acid of value for combating toxic substances of various sorts is aminoacetic acid or glycocoll. This is known scientifically as glycine, but is labelled otherwise in the trade because another compound used in photography and incorrectly dubbed "glycine" is poisonous. The detoxifying effect of glycocoll has been known for some time, and many of the early Ehrlich type drugs were combined with glycocoll to diminish the toxic effects of the drugs themselves. In the modern era, the co-administration of glycocoll with such medicinals as sulfapyridine has been claimed to lower toxicity effects.¹⁵

Another amino acid which is available at a relatively low price is tyrosine. Tyrosine has a chemical structure in common with antioxidants, so that its probable use for this purpose was predictable. Tyrosine, like other amino acids, is not oil-soluble. On simple conversion to an ester, it becomes, however, oil-soluble, and retains its antioxidant properties. The objection of toxicity raised to other antioxidants such as hydroquinone is not as valid here. The esters of tyrosine are accordingly receiving some attention as antioxidants in the pharmaceutical and food industries.

Biochemically, tyrosine is probably a precursor of thyroxine, the amino acid which is substantially the active principle of the thyroid. Tyrosine is believed to be converted physiologically into thyroxine in two reaction steps. Simulation of these reactions in glassware has resulted in low yields of thyroxine.¹⁶ Synthetic thyroxine, by a devious procedure, has been available for two decades, but not at a price which could compete successfully with thyroid powder. Further improvement of the process starting with tyrosine could change this picture.

Tyrosine is also believed to be a natural precursor of epinephrine.¹⁷ In our laboratories we are preparing iodinated tyrosine derivatives which are of interest for x-ray photography.¹⁸

Another amino acid which promises some special utilities as a detoxifying agent is methionine. Methionine has been successfully used to treat hepatitis of the type caused industrially by T.N.T. or carbon tetrachloride.¹⁹ Reports are also appearing which indicate that methionine may be useful in treating infective

hepatitis, or jaundice.²⁰ New syntheses have made methionine available in quantity.

Cysteine, which is also of biological value as a detoxicant, is an intermediate in the commercial synthesis of biotin. There is evidence for other amino acids functioning biologically as intermediates for vitamins. The conversion of alanine to pyridoxine²¹ and the conversion of aspartic acid to a part of pantothenic acid²² are examples.

SPECIFIC USES

To return to specific uses of amino acids, the lack of arginine in the diet of the male rat has been shown to result in a lowered production of sperm. This suggested arginine therapy for idiopathic hypospermia, and some cases have responded with definite stimulation of spermatogenesis.²³ The entire study was related to knowledge of the long-established fact that spermatozoa are known to contain considerable quantities of arginine.

Histidine has for many years been used in the treatment of gastric and duodenal ulcers.²⁴ Protein hydrolyzates have been recommended for this utility also, and oral administration suffices in this latter case.

Histidine is also closely related to histamine, which is produced from the former both biologically and chemically. Histamine is important because it is a causative agent in allergy and shock. Histamine has been used as a desensitizing agent itself. Histamine is also the gastric hormone. The appetizing effect of soy sauce can be attributed to the fact that soy protein has been hydrolyzed, one of the constituent amino acids was histidine, and that during the hydrolysis some small part of this is converted to histamine,²⁵ which in turn induces the characteristic peristaltic hunger response.

It is worth noting that for many of the most common maladies, such as cancer,²⁶ heart disease,²⁷ and hypertension,²⁸ there is no question but that proteinaceous substances and, therefore, amino acids are intimately involved. There are not sufficient data on which to render any prediction as to how amino acids will be utilized in the treatment of such diseases or indeed, if they will be utilized as pharmaceutical agents at all. We can be sure, however, that the growing knowledge of the reactions of the amino acids in glassware and in the organism will contribute to the solution of these medical problems.

As an example of how such knowledge may add to understanding, one may consider the relationship of amino acids to antibiotics. Bacteria, pathogenic or otherwise, require as we do, amino acids and proteins for their substance. Some bacteria can synthesize all of their own, others require substantially the same "essential" amino acids as we do. The form required is here also generally the left-handed type.

AMINO ACIDS AND ANTIBIOTICS

In the competitive struggle for existence among micro-organisms some creatures have developed antibiotic substances which interfere with the growth of others. This in fact defines an antibiotic. One of these substances, gramicidin, produced by *Bacillus brevis*, is a molecular combination of amino acids, as are many other antibiotics. The striking feature of gramicidin, however, is that 45% of its amino acids are of the *dextro* or "unnatural" form.²⁹

It has been found in our laboratories that the growth of many bacteria could be slowed down by the simple *dextro* amino acids, and that products obtained from these structures by chemical conversion also had this effect, in some cases more so than in the parent structure.^{30 to 32} These simple substances are not as powerful as the antibiotics but they offer some very suggestive leads. When the secrecy regulations covering penicillin were relaxed in December it was reported that the penicillin class of antibiotics is also derived from the peculiar right-handed amino acid structure.³³ A fundamental relationship between *dextro* amino acids, evolution, and therapy thus seems to be involved. There is some evidence that the right-handed amino acids and the antibiotics function by interfering with the activity of enzymes which normally influence the relations of "natural" molecules.

RELATIONSHIP TO ALKALOIDS

One further point: alkaloids such as quinine, morphine, pilocarpine, and others which are produced by some plants are believed also to arise in general from amino acids.³⁴ This suspected relationship has led to some beautiful experiments by Robert Robinson, in England, in which a few alkaloids were synthesized in laboratory glassware under physiological conditions from the indicated precursors.³⁵ It has also led to some attempts, in at least a few laboratories, to lower the cost of preparation of individual alkaloids by synthesizing them from amino acids.

CONCLUSION

In conclusion, definite lines of genealogy can be drawn from the amino acids to proteins, vitamins, alkaloids, hormones, antibiotics, and other substances of biological importance. Some of these relationships are so basic that they account for a large amount of research activity in this field. The established value of amino acid therapy in the form of protein hydrolyzates is a matter of clinical record, notably in a series of articles in the *Journal of the American Medical Association*.³⁶ Some individual amino acids have definite value as pharmaceutical agents and as chemical intermediates; other uses of this sort will without doubt be developed. The place of individual amino acids in the treatment of specific deficiency states is

beginning to receive evaluation. There can be no question that the amino acids are of great value in furnishing understanding in various fields of therapy.

If one confines his attention to any one class of biochemical substances, he can probably predict with impunity that the pharmaceutical industry will give it increasing attention in the future. Because of the basic and numerous relationships which they possess, the amino acids appear especially to warrant this prediction.

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Sharks' livers, which furnish three-fourths of the American supply of vitamin A, vary greatly in vitamin potency even within a single species.

Proceedings of Tenth Annual Conference of CAMSI, in Montreal, November 14 to 17, 1946

[We think it important to report on the proceedings of the recent annual convention of CAMSI. The opening paper by two CAMSI officers is a stimulating appeal to the youth of the profession to overcome what the authors aptly refer to as mental ischæmia. It deserves an even wider audience than the members of CAMSI.—EDITOR.]

MEDICAL CITIZENSHIP*

Sylvia J. Onesti and Robert W. Black

Montreal

The better title for this topic might be "The Doctor—Scientist and Citizen". In our present system of medical education the emphasis is laid on "The Doctor—Scientist". Little or no attention is directed toward "The Doctor—Citizen", and too often the doctor forgets to think of himself in this regard! "Professionally," said Alan Gregg, director of Medical Sciences, the Rockefeller Foundation, "we doctors resemble dictators in alternating between complete disregard of criticism and exquisite sensitiveness to it. Operating in an atmosphere of crisis met with confidence, naturally we develop a singular insularity of view, a sort of professional exemption from challenge and education at the hands of healthy and disputatious laymen. We behave as though we were a group set apart, and that attitude degenerates into a kind of *professional provincialism*."

It is as a prophylactic to prevent the insidious onset of this provincialism that this paper is being presented. To quote Dr. Gregg once more, "The drawbacks of provincialism are that it leads to intolerance, incredulity, indifference, ineptitude of human relations, and intermittent claudication of the mind. It also may excite and certainly unleashes those appalling siblings—envy and jealousy. We cannot participate in world affairs (in our case we might substitute 'national' affairs), nor in the search for truths, with such an overwhelming handicap."

Therefore, in an attempt to prevent this threatened ischæmia, we would like to present some of the problems that the young doctor must understand in order to be of benefit to the layman, the medical profession, and himself:

1. A knowledge of all national health schemes and their implications

Why should we, still resting in the quiescent womb of the educational institutions, take an *active* interest in and gain a fundamental knowledge of these schemes? Because these schemes,

* Presented at the Tenth Annual Conference of the Canadian Association of Medical Students and Interns, Montreal, November 14 to 17, 1946.

Miss Onesti is the Secretary and Mr. Black the President of CAMSI.

or reasonable facsimiles thereof, will be presented to the lay public *for vote* during the years of our practice!

Who will the laymen ask for advice about these matters? They will ask the man directly affected by their vote—the doctor. Failing to receive satisfactory explanations from him they will turn to the politician, that perennial source of good cheer and misinformation. If you want to protect your future, you will be informed on these matters.

2. How to plan and carry out the various health programs in a community.

The doctor must be able to take a leading part in the organization and administration of any health schemes proposed and passed by the lay public or any other body. Otherwise he may find himself working under someone or some non-medical group in the capacity of any employee. If the doctor is not prepared to organize and administer these schemes, therefore, it will be done by others—by laymen.

If on the other hand, the doctor is among those to take the first steps in organizing such schemes, this move may help block any legislation which is of detriment to the public and the medical profession.

It is doubtful if any young doctor desires to work as an employee under another body or person, exclusively outside his profession, especially after the years of study and the amount of money his education has cost. Therefore, it is for our own benefit that we must have knowledge and adequate understanding of these problems. If the doctor desires to practise medicine under ideal circumstances, he must have sufficient practical knowledge to know how to formulate his ideals. It is up to us and the medical profession as a whole to decide upon and plan the future of our medical practice.

3. The relationship of the doctor to his community

To many, this relationship is, and remains, a formidable abstraction. With his delivery into society, the young doctor is amazed to learn the quality and quantity of service expected of him by laymen as well as by the medical profession. He will be called upon for a multitude of services far removed or even divorced from his duties of preventing and curing sickness. He is responsible for a knowledge of and aid in the administration of sanitation programs in his community, for realizing and assisting all public health programs. He has a definite responsibility in the juvenile delinquency problems of his community, in the establishment and maintenance of adequate medical standards and facilities in the public schools. He has a responsibility in the establishment and successful maintenance of recreational facilities to benefit the health of under-

privileged children. It is impossible in such a paper as this to present all the responsibilities carried by a doctor.

Every available and useful means should be utilized to provoke thought and to stimulate interest in this side of the doctor's life. Stories and articles can be published in the *Journal* debates can be held, etc. The national executive of CAMSI offers the suggestion of *films* on the subject. A really interesting and educational film can be made showing the young doctor embarking on his practice in a community; showing him as he visits the local judge; interviewing the public school boards; speaking with the public health officers; as he goes about setting up his practice and attempting to cope with the deluge of problems facing him, only a comparatively few of which are actually medical. Through the use of films, every facet of this subject can be high-lighted, dramatized and personalized until this appalling barrier of provincialism in the minds of the medical students is overcome!

The medical faculties cannot be blamed for placing minor emphasis on the rôle of "The Doctor—Citizen", since it takes a full four or five years to build the foundation for "The Doctor—Scientist". As much as possible is dealt with in the curriculum on the social training of the doctor, and the rest is left to experience. It is in this regard that an organization such as CAMSI can be of great benefit to the student, the intern, and the medical profession as a whole. A number of individuals or committees can be selected from among all or several of the schools across Canada to study specific problems representative of different localities and to present their findings as editorials in the CAMSI *Journal* for the benefit of all students and interns. Also, men representative of various fields of medicine and allied groups can be asked to express their views through the *Journal* or by other means. In our opinion, this is one of the best possible methods by which we can educate "The Doctor—Citizen".

Another aspect that could be expanded for the education of the student and intern is considerable practical information concerning various fields of medicine, including the many new fields now opening for the younger man. This may help to eliminate considerable indecision and provide a wider scope as he attempts to decide the type of practice he will enter.

Is medical citizenship an impractical, vague ideal, or is it not a plan to benefit the student, intern and the practising doctor of the future? Is it impossible of attainment except by the visionary few, or is it not a factor which is going to be of prime importance in your lives? *Any* type of training or education that will prepare the young doctor for his future, in the community, is a part of medical citizenship.

We, as a national executive, consider it to be one of the chief justifications of this organization; and if, as a legacy, we can leave you a few provocative ideas on the subject—we shall feel our work well done.

ABSTRACT OF PROCEEDINGS

The Tenth Annual Conference of the Canadian Association of Medical Students and Interns was held at McGill University, Montreal, on November 14 to 17, 1946. The National Committee was composed of two delegates from each of the following schools: Alberta, Dalhousie, Manitoba, McGill, Queen's, Toronto, and Western. Observers were present from the Universities of Montreal and Laval, both temporarily inactive members; from Ottawa University; a representative from the Intern group in Kingston, and from the newly formed Montreal Intern Council. The CAMSI National Executive sat on the National Committee, but with no voting power. The chairman of the conference was Robert W. Black, National President.

Among the more interesting resolutions and discussions were those concerning: (1) Medical citizenship; (2) Affiliation with the Canadian Medical Association; (3) Intern problems; (4) Medical films; and (5) Grants.

Medical citizenship.—The paper on this subject appears in this issue of the *Journal*. The topic is considered to be of primary importance by the outgoing National Executive, and is the foundation upon which CAMSI policy is built. The ensuing discussion by the delegates indicated a national agreement that medical citizenship should be our main pursuit. Accordingly, resolutions were passed that CAMSI investigate fully all possibilities of exchange graduate intern rotations between English and French schools as well as the possibility of interchange of student summer interns between French and English schools. It was also resolved that CAMSI sponsor the idea of a compulsory seminar and lecture course, with medical and lay teachers, on health planning, and a non-compulsory discussion and lecture course on the sociological problems of medical practice and the problems of the medical practitioner. All possible avenues will be explored in order to put these resolutions into effect as soon as possible.

Affiliation between CAMSI and the CMA.—Since the Ninth CAMSI Conference in November, 1945, the National Executive had been investigating the possibility of this affiliation. Mr. Black, National President, and Miss Honor M. Kidd, past Editor-in-Chief of the CAMSI *Journal*, were invited to attend the General Council meetings at the annual meeting of the Association at Banff in June, 1946. These two CAMSI delegates were given a most cordial reception, and the meeting resulted in the CMA's invitation to CAMSI to affiliate. By

such affiliation CAMSI could seat two representatives on the General Council of the CMA with full voting power.

A full report of the investigation and results was presented by Mr. Black at the CAMSI conference, where it was resolved unanimously that the CAMSI shall be an affiliate of the CMA and shall send two representatives selected by, and preferably from, the National Executive to the General Council of the CMA. The CAMSI Constitution was amended to include a delegate from the General Council of the CMA on the CAMSI National Executive Committee, with full voting power.

This affiliation should prove highly successful and beneficial to both parties. The purpose of any national organization is to sift all points of view in order that common problems may be solved in the best possible manner for the benefit of all concerned. This step toward a closer liaison between the respective bodies should provide a broader view-point for both and will certainly provide greater rapport.

Intern Problems.—As might well be imagined, this subject caused a lively discussion. The Secretary read a brief "historical" survey of reports on "Intern Problems" made at each CAMSI conference since the organization's inception. Each delegation was then asked for the majority opinion of the schools on the question of remuneration for interns. The consensus was in favour of some form of remuneration or "honorarium" in order that a larger number of students could receive postgraduate medical training.

The greatest part of the discussion was spent in a definition of terms, confusion arising from the fact that there is no standard length of curriculum among the medical schools. The intern year was defined as a year involving the care of patients on a hospital ward, under supervision of senior practitioners. It may be undergraduate or postgraduate. The line of division between the undergraduate and the postgraduate was considered to be the license to practice. Unless a man has earned his license he is not, in the eyes of the law or the medical profession, considered capable of practising medicine without guidance; he is, therefore, still in the period of training. Thus, the undergraduate, or un-licensed intern, still under the control of the university, has no legal right to request payment for services rendered, but he is entitled to the best of staff and teaching facilities, and to adequate living conditions. The postgraduate, or licensed intern, in most cases needs financial assistance for his postgraduate medical training, especially now when so many years are required for the specialties.

Two problems exist, therefore: that of (a) the licensed intern, a man entitled by law to request some form of financial remuneration; and (b) the unlicensed intern, or undergraduate, a man entitled to the best of educational

facilities but without legal right to request payment. In both cases, the solution to the problem is extremely difficult at present; accordingly, they were discussed separately.

At length, it was resolved that CAMSI go on record as supporting financial assistance for postgraduate medical training. Suggestions were submitted for consideration which included the possibilities of; (1) intern fees charged on every hospital bill; (2) direct Dominion-Provincial grants to the hospitals; (3) extension of insurance schemes, such as the Blue Cross; and (4) enrollment of 1,000 interns in Canada's standing army. Since it is clear that hospitals cannot afford to support this idea, it was further resolved that CAMSI opposes any attempt to force hospital boards to pay intern staffs, and that the National Executive of CAMSI pay particular attention to, and attempt to secure, Dominion and/or Provincial grants, scholarships and loans for postgraduate medical training.

The undergraduate problem is one more directly concerned with that of medical education as a whole, and certainly of equal importance, though the possibility of solution is more difficult. It was suggested, however, that a committee be set up to study further the conditions and situation at hand, with special emphasis on the availability of financial aid now existing for undergraduate interns.

Finally, it was resolved that: "*Whereas* we realize that the question of financial assistance for postgraduate medical education is fundamentally one of the high cost of medical education as a whole; and *whereas*, therefore, we feel that all bodies concerned in the teaching and practice of medicine should be represented on a committee, *we hereby move* that (1) a committee be formed to investigate ways and means of providing financial assistance to interns, and (2) *that this committee be formed of the National Executive of CAMSI and representatives from the CMA and the Canadian Hospitals Council and such other persons as the National Executive of CAMSI may deem to be of assistance to the committee, and (3) that this committee be empowered to set forth any recommendations for such action as they deem advisable.*"

It cannot be over-emphasized that there are two definite problems to be considered. The National Committee has recognized this fact, and the CAMSI will attempt to deal with the situation accordingly.

Medical films.—The many advantages of a comprehensive plan of visual education have long been recognized in every teaching field. The integration of films in the medical curriculum has started in many of the schools, but the students have expressed a desire for more of these films to be incorporated in their studies. The National Film Board has compiled an excellent library from which these films can be drawn, and a substantial discount

has been made available to CAMSI in the rental fees. Therefore, the National Executive has been empowered to make arrangements through the National Film Board to obtain medical films to be shown before the respective medical undergraduate societies, and the total rental charges for these will be borne by the CAMSI Treasury up to \$315 per year. It is hoped that CAMSI and the medical faculties can thus work together to provide a curriculum enriched by the benefits of greater visual reinforcement.

Grants.—One of the more progressive resolutions made at this conference was that the National Executive shall appoint a committee to investigate endowment plans, and shall draft a CAMSI plan with a view toward establishing a CAMSI scholarship on every medical campus.

COMMENT

The Tenth Annual Conference of the CAMSI was, we feel, a success in every sense of the word. Twenty-eight students and interns representative of the medical schools from all Canada sat at the Conference table for approximately ten hours a day for four days, discussing common problems and attempting to reach possible solutions. A mental and spiritual union was achieved by this group which will prove an inspiration to us all. The world's plan of education has been mostly priestly—men have striven to inculcate trust and reverence. Men have cited authorities and quoted precedents and given examples: it was a matter of memory, but the whole spiritual acreage was left untilld. A race educated in this way cannot advance, save as it is jolted out of its notions by men with either a sublime ignorance of, or an indifference to, what has been done and said. True education can come only through doing things, making things, going without things, talking about things.

Youth lays great plans, is always in revolt against the present order, groups itself in bands and swears eternal fealty; and life, which is change, usually dissipates the plans, subdues the revolt into conformity, and the sworn friendships generally fade away into dull indifference. The aims of the CAMSI are for true education, and we are typical idealistic youth. It is, however, our hope and sincere belief that we can and will achieve our goals and provide a real contribution in all things medical and sociological in Canada. We know that this can be done because for the first time an active attempt is being made to bridge the gap which has always existed between the lives and thoughts of each generation. Now youth can lay its plans for the future with more serious thought, knowing that these plans need not be set aside but may be incorporated into the scheme of things as they are now and shall be in the future.

SYLVIA J. ONESTI, *National Secretary, CAMSI*

CLINICAL and LABORATORY NOTES

ACID-FAST BACILLI IN PARAFFIN SECTIONS OF TUBERCULOUS TISSUE*

A. R. Armstrong, M.D., B.Sc. and N. E. Price

Hamilton, Ont.

The demonstration of tubercle bacilli in histological sections of tuberculous tissue by recognized methods is difficult. Findings are usually negative in material known to be tuberculous. Hence relatively few laboratories carry out the acid-fast staining of sections even in special cases.

Sole reliance for diagnosis in the absence of culture is placed on the presence or absence of the typical tubercle formation. Yet typical epithelioid tubercles are not always present in tuberculous tissue and it must be recalled that the first response to virulent infection may be a polymorphonuclear neutrophilic one. Moreover, it is well known that, in tissue containing typical tubercles, there may also be large areas of inflammatory reaction which taken alone could not be identified as tuberculosis. Such areas are frequently encountered by themselves in the small specimens necessitated by aspiration and other types of biopsy.

There has been, thus, a real need for development of a simple rapid method for staining acid-fast organisms in just such instances.

It was, therefore, with much enthusiasm that phthisiologists and pathologists in general noted the recent report of Tilden and Tanaka¹ on their experience with a staining technique first described by Fite.² These authors confirmed that the new staining was highly reliable in demonstrating acid-fast bacilli in tissue and they were able to modify the technique so as to reduce the staining time from twenty-four hours, as originally described, to about one-half an hour.

The details of the actual staining are as follows (the sections being cut and mounted, etc., as for routine histological work):

Solution	Time
1. 0.5 g. "new fuchsin"	
5.0 g. phenol	5 mins.
10 c.c. ethyl alcohol	
Water to 100 c.c.	
2. 40% formalin	5 mins.
3. Acid alcohol	5 mins.
4. 1% KMnO ₄	2-5 mins.
5. 2% oxalic acid	30 secs.
6. Harris hæmatoxylin	2-5 mins.
7. Acid fuchsin 0.01 g.	
Pierie acid 0.5 g.	5 mins.
Water to 100 c.c.	

Each of the above steps is preceded by a brief washing in water.

The original article by Tilden and Tanaka, as well as that of Fite, should be consulted as to purity of reagents and details of preparation of solutions.

* From the Laboratories of the Mountain Sanatorium, Hamilton, Ontario.

The purpose of this communication is to present our own findings in regard to the efficiency of the new staining procedure in detecting tubercle bacilli in 100 instances of known tuberculous tissues.

The material selected for study consisted of autopsy, surgical and biopsy specimens. It was always believed to be tuberculous, either by reason of histological appearance, by cultural procedures, or because of the presence of generalized tuberculosis in that particular patient. In the case of autopsies, not more than three or four tissues were examined from any one case so as to be certain of studying more varied types of disease. The number of individual patients involved altogether was 56. There were 37 autopsies, 10 surgically treated cases, 1 obstetrical case, and 8 on whom biopsy had been performed. The organs involved were:

Tissue	No. of specimens
Lungs	53
Lymph glands	12
Kidneys	9
Intestines	6
Liver	3
Spleen	3
Sinuses	2
Adrenal	1
Appendix	1
Brain	1
Bronchus	1
Epididymis	1
Knee Joint	1
Peritoneum	1
Placenta	1
Subcutaneous tissue	1
Unidentified	3

The results were most encouraging, for 93 of the 100 tissues were found to contain acid-fast organisms. One tissue gave a doubtful result. Six seemed to contain no organisms. Details of these six were as follows:

1. This tissue was placenta. The H. and E. section on re-examination did not appear tuberculous histologically and the specimen probably should not have been selected as one of the series.

2. This was a kidney surgically removed from a case of proved renal tuberculosis. H. and E. section revealed the presence of some necrotic material well surrounded by fibrous tissue and lymphocytes. Epithelioid cells and giant cells were rare. It is believed that the healing process was well advanced in this instance.

3. This was a lymph gland from a postmortem on an individual who had far advanced chronic tuberculosis. Restudy of the Fite's stained sections showed that there was no histological evidence of tuberculosis in these particular sections.

4. This was a lymph gland from autopsy material submitted from another institution. At time of writing details of this case are not available. Histologically, it appeared to be tuberculous.

5. The identity of this tissue was not established, although it was thought to be lymph gland. Histologically it appeared tuberculous and the case itself was one of clear-cut massive bilateral early tuberculous bronchopneumonia.

6. The tissue in this instance was lung. Histologically only very slight evidence of tuberculosis was noted in this section, the case being predominantly one of renal tuberculosis.

It is to be noted that, although blocks were recut once if found negative, really vigorous search for organisms was not made, since the object was to approximate the treatment which tissues would likely receive in a busy routine laboratory rather than in a research institute.

The above findings confirm and extend the observations of Fite and of Tilden and Tanaka. It is believed that the introduction of the new technique applied to biopsy material will assist greatly in the detection of obscure tuberculosis in many instances. It has, therefore, now been adopted as routine for this type of work at the Mountain Sanatorium, Hamilton.

Experiments to restudy the distribution of tubercle bacilli in cavity walls and elsewhere, using this new and more sensitive method for their demonstration, are at present being planned.

The authors wish to thank the medical superintendent, Dr. C. H. Playfair, for his kindly interest in this study and the Board of Directors of the Hamilton Health Association for financial assistance.

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ANTI-RETICULAR CYTOTOXIC SERUM (ACS)

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Various investigators in Russia have claimed that small doses of an "anti-reticular cytotoxic serum" (ACS) stimulate mesenchymal cells, while reversely, large doses have a paralyzing effect, the mesenchymal cells, according to theory, being the most important reparative cells in the body. ACS is usually prepared by immunizing an animal (sheep, goat, donkey or horse) with antigen taken from the spleen and rib marrow of a human cadaver, in patients who have died within ten hours from some other cause than an infectious or malignant disease. Theoretically the connective tissue is supposed to possess the following functions:¹ (1) A trophic function which regulates cellular metabolism. (2) A plastic function which aids in the regeneration of tissue. (3) A protective function by phagocytosis. (4) An autoregulative function through various internal secretions. (5) A mechanical function of assisting the osseous system.

ACS has been used in Russia with claimed success in highly diversified conditions. It is stated that small doses 0.05 to 0.1 c.c. stimulate the function of the connective tissue and large doses inhibit it; also that the earliest effects, as a rule after the second injection, consist of a lymphocytosis, dilation of the capillaries and increased permeability of the "hæmato-parenchymal barrier". Following its correct dosage

there is said to be a fall of the sedimentation rate.

In the preparation of ACS for use in humans Marchuk states,²

"Briefly this consists in preparing an antigen by mincing 5 to 15 gm. of tissue in the proportion of 8 to 9 parts of spleen of the human cadaver, with one to two parts of marrow. These are ground in a porcelain mortar and a volume of physiological saline is added equal to five times the weight of the tissues. Half of the resulting suspension is centrifuged at 1,000 r.p.m. for three to four minutes. The layer of fat is removed from the supernatant fluid; the remainder then serves as the antigen for intravenous injection while the uncentrifuged portion is given orally.

"The best method of immunizing animals to obtain ACS is by intravenous injection. The antigen is injected five to six times in increasing doses at intervals of four to five days and the titre of cytotoxins in the serum is determined by complement fixation eight or nine days after the last injection."

The conference called by the Institute of Clinical Physiology of the Academy of Sciences of the Ukrainian S.S.R. and by the Ukrainian Institute of Experimental Biology and Pathology of the People's Commissariat of Public Health of the U.S.S.R., held in Ufa July 12 to 14, 1942, together with delegates from the Moscow, Kiev, Kharkov and Bashkirian medical institutes, as well as evacuation hospitals of different regions and towns, heard over 40 reports and passed the following resolution:³

"On the basis of over 2,500 clinical observations presented at the conference, the therapeutic effect of anti-reticular cytotoxic serum was clearly established in war traumatism and the following diseases: (1) Frostbite and wounds. (2) Infectious diseases (including spotted typhus, puerperal and gynaecological sepsis, rheumatism, unresolved pneumonia and lung abscesses, tonsillitis). (3) Diseases of the nervous system, including neuritis, meningo-encephalitis, disseminated sclerosis as well as schizophrenia and various psychoses. (4) Eczema, peptic ulcer and ozena."

It is stated that the serum is of value in so many conditions because it does not act upon bacteria or their toxins but upon the reactivity of the connective tissue. Adults have been given as much as 0.1 to 0.25 c.c. as a stimulating dose and in some instances 0.3 c.c. It is injected only in a 1 to 10 solution of physiological saline. If given intravenously or subcutaneously, from 1 to 2.5 c.c. of the diluted serum solution may be used and this may be repeated and tripled after an interval of two or three days but the second should not be given more than ten days after the first injection. Two days prior to injection, the serum is diluted in sterile physiological saline (1 to 10); this solution is then poured into ampoules, sealed and stored in the refrigerator and is warmed to 37° C. in water before injection. The titre of cytotoxins is maintained in the serum, at a temperature of 40° C. and in darkness, for an average of 6 months.

COMMENT

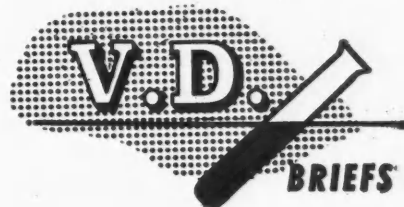
ACS has been used to a limited extent in cases of rheumatoid arthritis without obvious

therapeutic effect in England and the United States. Jackson⁴ reports that in 24 cases of atrophic rhinitis treated by him there was no improvement in the majority of patients, but a few showed some improvement mostly in subjective phenomena. No change was noted in the size of atrophic structures. The cause of the difference between these results and those reported by the Russians is not obvious. ACS may have been employed in these countries in various other diseases unknown to the writer. Be that as it may, further investigations are reported to be authorized in this country by the National Research Council and hence the reason for this report. It is difficult to see how they can prove profitable but the expenditure is warranted when one recalls the history and results of recent antibiotic therapeutic discoveries.

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VENEREAL DISEASE CAMPAIGN



The Nurse as a Case Finder in Venereal Disease*

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Any discussion of the place of the nurse in a certain aspect of venereal disease control must necessarily include case finding. The purpose of this paper is to discuss case finding as a separate subject and to examine the place of the nurse in this field.

It is well known that the close nurse-patient relationship provides many opportunities for the establishment of confidences which may be used to good advantage by the public health nurse in case finding. In order to utilize these confidences as a means of promoting early case finding in venereal disease the nurse must have adequate tools with which to work. An important tool and a prerequisite to the nurse's contribution is a knowledge of the medical essentials—causative organisms, incubation periods,

* From the *Journal of Venereal Disease Information*, November, 1946.

modes of transmission, principles of prevention, and treatment.

Inadequate venereal disease courses in the basic nursing programs have resulted in certain limitations in this area of nursing performance. Until nursing schools include adequate preparation in the venereal diseases, all nurses will not be equipped to do their best work in early case finding.

In some schools, efforts are being made to provide more time in the curriculum for this subject. Nurses actively participating in venereal disease control and health officers, as individuals and as a group, should use every opportunity to stimulate nursing school facilities to continue and to strengthen venereal disease education for student nurses.

The four major responsibilities of the public health nurse have long been recognized as: (1) case finding; (2) case holding; (3) health teaching; (4) care of the sick.

Emphasis has been placed on the terms "case-finding techniques" and "interviewing" to the point where they would seem to have some special and perhaps separate connotations in venereal disease control. It should be remembered that every case of any disease found by whatever method must ultimately be interviewed.

All case finding in public health nursing is based on interviewing—mothers are interviewed and aided regarding their problems in pregnancy, the care of their newborn, child training and development, and guidance of the adolescent; school teachers and pupils frequently are interviewed by the public health nurse. In tuberculosis control, interviewing plays a prominent rôle, the industrial nurse interviewing employees daily.

As a matter of fact, following just one of the principles of public health nursing—"That services of the public health nurse shall be available to all in the community according to their need"—the nurse in her interviews cuts through a large segment of the population in the community. Because of this, opportunities for case finding are limitless.

Her interviewing techniques, some of which are inherent in nursing and some of which might be called applied science or art, are as numerous and varied as the interviews themselves. There should be no standard routine to be followed in employing interviewing for case finding. Such standardization would deny the nurse the privilege of using her initiative and the patient the individualization he deserves. Her case-finding techniques are founded on an understanding of the basic philosophy of nursing.

The aim in interviewing always is to have the patient reveal all his contacts. For this reason, it is ill-advised to say "From whom do you think you got this?" It is much better to explain to him that his infection was unknowingly passed to him and he, in turn, may be responsible for having passed it on to others; that in order to

help these people to have the same opportunity for cure that he is now enjoying it will be necessary to examine any person with whom he has had sexual relations during the time of probable infection or infectivity. (It is necessary to express this in days and weeks specifically related to the type and stage of infection.) The patient's responsibility for preventing further spread should be emphasized; and now that penicillin is providing such rapid cure, it is all the more important to advise the patient of the possibility of reinfecting himself by resuming sexual relations with persons who might be in the very early stages of disease as a result of exposure to him prior to treatment.

The patient is often reluctant to name contacts because of concern over the manner in which the contact might be approached, but satisfaction to the patient may come, and co-operation usually can be gained, by asking him to participate in the procedure of contact tracing. If the patient's attitude toward the contact is wholesome, and he feels an obligation to help this person to secure an examination, he should be permitted to make the explanations.

On the other hand, if the patient vehemently declares that he will "bring her in by the nape of the neck", tact must be employed to persuade him that it would be best to let the agency make the approach to the contact. The patient, knowing the living conditions of the contact, may be able to make the best selection of the various means employed by health agencies in contact tracing, and his opinion should have bearing on the procedure to be followed. A satisfied patient can do much to influence his acquaintances to seek medical attention by making it known that good diagnostic and treatment facilities are available.

It is not only to the diagnosed case and his contacts that the nurse must look for case-finding opportunities in venereal disease. In the routine of her daily visits to the home, industry, school, or clinic, she often is confronted with statements which the alert nurse finds significant in relation to venereal disease. For instance, a wife, in her last few months of pregnancy, may tell the nurse that her husband has become unfaithful and may hint at the presence of disease symptoms. Or she may express concern over the teenage boy or girl in the family, who may have drifted into bad company reported to have venereal disease. Or perhaps a husband, knowing the confidence his wife has in the nurse, drops by the office to ask her assistance in bringing his wife to an understanding of her marital responsibilities, incidentally revealing, in the course of this visit with the nurse, that he has a slight sore for which he has obtained a salve from the druggist. The adolescent boy or girl, the prospective marriage candidate, the industrial worker whose sexual promiscuity is revealed to the industrial nurse, all provide sources for case finding.

THE CANADIAN MEDICAL ASSOCIATION

Editorial Offices—3640 University Street, Montreal

(Information regarding contributions and advertising will be found on the second page following the reading material.)

EDITORIAL

SMOKE POLLUTION

THE menace to health of smoke pollution in the air is a well worn subject. In some large cities it still remains as a direct menace because the pollution is so gross. In others it is less obvious and so is only called a nuisance. In these latter instances therefore it is more difficult to deal with since the threatening element is not apparent. There should however be no such differentiation. Who is to say when the nuisance turns into the menace, and why should the nuisance not be dealt with in any case? Smoke pollution of any degree should be regarded as bad for a city both as regards health and in economic results. There is an element of the ridiculous in the fact that so many miners are employed to produce smoke whilst probably as many other people are paid to make good all the damage produced by smoke.

So much attention is focussed on the evil effects to health and our pockets (in cleaning bills) that it is not usually realized how comparatively simple it is to prevent unnecessary smoke production by other than legislative measures, which in fact are so seldom applied as to be ineffective. The smoke from a chimney means a mixture of solids and gases and moisture, and the thicker the smoke the more solids there are; that is, the more unused fuel is being put into the air. The worst offenders of course are large heating units, as in factories and large apartment buildings. This waste is produced either by bad stoking or by badly cared for heating apparatus, or by both. To produce rapid heating the draught is increased too quickly and combustion is incomplete, the unused material going out as a waste as well as a nuisance. Or the choking of flues with ash or soot increases flue gas velocities and so carries out ash instead of allowing it to settle. Even light smoke over a long period represents heavy waste.

It may be doubted whether the average owner of such smoke-producing sources realizes how costly smoke is to him directly in his fuel bill, or how easily remediable is the waste. There should be constant education of the public as to the facts of smoke pollution, its effects and its remedy. Only so will public opinion become effective in checking what is always a nuisance and is never far removed from being dangerous; in either case being very expensive.

EDITORIAL COMMENTS

Dr. C. A. Gauthier

We quote below an item from *l'Action Médicale* (November, 1946) announcing the appointment of Dr. C. A. Gauthier of Quebec, as Professor of ethics and medical economics at the University of Laval. We agree most sincerely with the sentiments expressed in connection with Dr. Gauthier's appointment.

"Le docteur C.-A. Gauthier (de Québec) que tous connaissent et apprécient pour son jugement, sa haute conscience et son dévouement à défendre nos intérêts professionnels, vient d'être nommé professeur de déontologie et d'économie médicale à la Faculté de médecine de l'Université Laval. Voilà un choix judicieux. Le docteur Gauthier était admirablement préparé pour remplir ces fonctions. Ceux qui l'ont vu à l'œuvre dans nos sociétés et associations médicales sont convaincus que les étudiants l'apprécieront et qu'il aura une heureuse influence sur la jeune génération."

D.V.A. Central X-ray Film Library

The following announcement by the Department of Veterans' Affairs will be welcomed by all those who are interested in obtaining information regarding x-ray films taken of patients by the armed services.

"The Department of Veterans' Affairs has now set up a Central X-ray Film Library, which will function at Head Office effective November 1, 1946.

"This library will have in its custody x-ray films of the three Armed Services and their respective auxiliary services, with the exception of films pertaining to serving personnel of the Navy.

"After November 1, 1946, all requests for the loan of films and any communications concerning x-ray films from any civilian hospital and from doctors not on departmental strength should *not* be addressed to the respective Armed Services. Instead, they should be sent to the Departmental District Medical Officer of the D.V.A. District concerned, who will for-

ward the request to Head Office and who will in turn be responsible for the return of the films there.

"The attention of all concerned is invited to the necessity of supplying complete information when requesting films on loan. *This is important*, for if the correct information is not supplied, it necessarily follows that research and checking must be done by the staff of the Film Library to ascertain the correct film to despatch."

MEDICAL ECONOMICS

THE NATIONAL HEALTH SERVICES BILL FOR ENGLAND AND WALES

By T. C. Routley, C.B.E., M.D.,
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Toronto, Ont.

While in the British Isles on two occasions this past autumn, I had unusual opportunities to study Governmental proposals to provide medical care for everybody in England and Wales. The necessary Bill has passed the House of Commons. Certain amendments were proposed in the House of Lords which, in the opinion of the medical profession, improved the Bill somewhat, but the legislation, very substantially as drafted by the Government, was finally approved and it is anticipated that it will go into effect early in 1948.

An additional Bill for Scotland has been published and it is confidently anticipated that it will also be translated into law, thus providing a like service for that portion of the United Kingdom.

It was my privilege to meet the Right Honourable Aneurin Bevan, Minister of Health, Sir William Douglas, Secretary of the Department of Health, Sir Wilson Jameson, Chief Officer of Health, Sir Arthur Rucker and a number of other members of the Department. These gentlemen received me most cordially and manifested a keen desire to explain the legislation and answer my questions. Many of the details of the legislation I discussed with Sir Arthur Rucker whom I found to be well versed in the field of medical economics. When I suggested to him that the Bill struck me as being dictatorial in that it placed too much power in the hands of the Ministry of Health, he replied that it was not his responsibility to weigh or assess its political import but rather to carry it into effect, and I am confident that he is the type of man who will throw all his energies into his task.

It was also my privilege to meet and talk with officers of the British Medical Association, leading members of its Council and Representative Body and a number of individual practi-

tioners including specialists. I attended a branch meeting of the B.M.A. in Wiltshire and also made a flying visit to Scotland. Needless to say I found that the medical profession of the British Isles is gravely concerned about this legislation and great activity goes on in the B.M.A. in an attempt to determine what action the profession should take. On all sides, the burning questions seemed to be:

Now that the legislation has become law, should we negotiate with the Government and try to salvage the best possible out of the Bill, or should we refuse to negotiate and thus make clear that we will have nothing to do with it?

If we refuse to negotiate, will the profession stand together and will the public support the position we take?

It is common knowledge that the party which forms the present Government in England is on record as having strongly advocated complete socialization of the medical profession, and the profession holds that the only reason the administration has stopped short of the party's goal in the present Bill is the fear that the profession could not be persuaded to swallow more than is now proposed. However, the Doctors believe that the Government hopes and expects that, in progressive stages, it can move on to the complete fulfillment of the party's pre-election pledges of free treatment for everybody from the cradle to the grave with the doctors ultimately becoming whole-time employees of the State.

Many doctors with whom I discussed the legislation were of the opinion that, under the new Act, the medical profession of the United Kingdom will slowly but surely be sucked into state medicine by becoming full time salaried civil servants although the language of the Act does not emphasize the financial arrangements under which the Doctors shall serve.

The medical profession in the United Kingdom, as represented by the British Medical Association, are in favour of providing the best possible medical care to all the people and find many things in the proposed legislation with which they are in accord but are opposed to a number of the provisions of the Bill, including the following:

1. The taking over of ownership of hospitals by the State.
2. Cancelling out of the buying and selling of practices.
3. Controlling the distribution of Doctors.
4. The Minister's expressed intention to remunerate the Doctors, partly by salary.
5. The wholesale establishment of health centres without preliminary experiments.
6. The placing of final authority in the hands of the Minister of Health.

7. Moving in the direction of State Medicine with prospects of the profession becoming full time salaried civil servants with complete loss of their professional freedom.

Right now two great opposing forces are at work. The Minister and his colleagues are telling the people that the legislation is one step on the way towards complete social security. The leaders of the medical profession are telling their colleagues and the people that the legislation is one step (and a very big one) towards complete State Medicine, with consequent loss of medical freedom.

Here are some of the comments made to me by members of the medical profession:

"This legislation will set medicine back 50 years in this country."

"The Government has decided on a scheme of service. Whatever we think of it, it is our job to work it."

"It is vicious legislation. We must do our best to kill it or it will stultify the profession and make for progressively poorer medical service."

"The scheme looks bad but until I know the details of the regulations, I cannot be sure so I shall withhold final judgment."

"Bad, simply bad legislation. But what can you expect from a Government pledged to socialize mostly everything?"

"If it gives Doctors security it will mean better service for the public. I am prepared to give it a try."

"One does not need to be a prophet to forecast how badly this legislation would affect the medical profession; and the public ultimately would get poorer service."

"It is a political measure, surely, and sets up a dictatorship in the Ministry of Health which the profession believes it cannot tolerate."

"The profession will soon become Governmental chattels."

"As law abiding citizens we must accept the Act. I am not favourable to the present Government but I am willing to try the new scheme."

"Parliament has spoken. The Doctors have no option but to try it out. The Government will be obliged to draft regulations which will be satisfactory to the Doctors or the scheme will fail."

It will be observed that some Doctors defend the measure. I found others whose opposition was largely centred on what they thought were the dictatorial aspects of the Act, namely the taking over of hospitals by the Government and the doing away with the buying and selling of practices. But now that the legislation is on the statute books, the time has arrived when a decision has to be reached by the Negotiating Committee which represents the British Medical Association and the other professional medical bodies.

When I left England in November, the Negotiating Committee had issued to every Doctor in the British Isles a plebiscite. I quote it hereunder:

TO EVERY MEMBER OF THE PROFESSION

The time has now come for a crucial decision by the profession. The Act authorizes the Minister now to proceed to make Regulations dealing with a wide variety of subjects, including mode and amount of professional remuneration, the terms and conditions of service generally, and the composition of Regional Hospital Boards.

The immediate practical issue which confronts the profession is whether it will or will not enter into discussions with the Minister on the subject matter of these Regulations. This is the issue which the Association places before the profession as a whole to determine by plebiscite.

To decide this issue is, by implication, to decide others.

Those who hold that, notwithstanding the divergence between the principles of the profession and the provisions of the Act, discussions upon the Regulations should be entered upon will answer "Yes" to the appended question. A decision to enter upon discussions does not involve a decision to enter the Service.

Those who hold that, in view of the wide divergence between the principles of the profession and the provisions of the Act, the profession should decline to accept Service under the Government's scheme, *whatever* the Regulations governing terms and conditions and other matters, will not authorize discussions with the Minister on Regulations and will answer "No" to the appended question. If a sufficient majority of the profession give a negative answer, the Association will take the necessary action and prepare for the inevitable conflict. Implicit in such a negative vote by general practitioners and members of visiting hospital staffs is an undertaking, if so advised by the Association, not to enter the new Service.

1. DO YOU DESIRE THE NEGOTIATING COMMITTEE TO ENTER INTO DISCUSSIONS WITH THE MINISTER ON THE REGULATIONS AUTHORIZED BY THE NATIONAL HEALTH SERVICE ACT?

(Please answer Yes or No)

2. PLEASE STATE THE NUMBER OF YEARS SINCE YOUR QUALIFICATION.
3. PLEASE INDICATE BY A CROSS IN ONE COLUMN ONLY THE PROFESSIONAL WORK IN WHICH YOU

ARE WHOLLY OR PREDOMINANTLY ENGAGED.

Signature and address of Doctor making this reply.

.....

As the statement accompanying the plebiscite clearly indicates, the medical profession in the British Isles are now facing the most crucial test in their history. If they refuse to negotiate, the Government will be under the necessity of working out the Regulations by itself. According to the B.M.A., it would then be very difficult to put the scheme into effect because the Doctors would not work it. On the other hand, if the Doctors decide to negotiate, it would seem reasonable to assume that they would have some influence on the content of the Rules and Regulations and they would still have the right to refuse to operate the Act if they did not approve of the Rules and Regulations. Accordingly, there are two schools of thought in the profession with respect to the Act. The "all-against" say, "Have nothing to do with it; do not negotiate". The more cautious say, "Let us negotiate in the hope that rules and regulations may be devised under which we can satisfactorily practise".

The whole world—certainly the medical world—is interested in watching the health legislation which is being developed in the British Isles. Without a doubt, the medical profession there are at the cross roads and a socialist government which is pledged to nationalize banks, transportation, mines and medicine is directing the traffic. The British Medical Association has 53,000 members, representing about 80% of the medical population of the British Isles, and a large majority of the profession appear to place implicit faith and confidence in their Association to lead them successfully through the present crisis.

Having discussed thus far what might be described as the implications of the Act, it would now seem appropriate to review it. I am indebted to the Negotiating Committee of the British Medical Association for having provided me with the following information. It is fairly lengthy but, because of its great importance and interest to the medical profession, it has been considered wise to present it in full. It is considered that the numbering of paragraphs will facilitate reference to the various sections of the summary.

A SUMMARY OF THE NATIONAL HEALTH SERVICE ACT

1. The Act places a general duty upon the Minister of Health to promote the establishment in England and Wales of a free, comprehensive health service designed to secure improvement in the physical and mental health of the people, and the prevention, diagnosis and treatment of illness.

The Act deals only with the main structure of the service. Its detailed administration will be governed by Regulations to be made by the Minister under the powers which the Act confers upon him.

The main provisions of each part of the Act are summarized below.

PART I. CENTRAL ADMINISTRATION

2. The Minister of Health is given general responsibility for the organization of the service. To provide the Minister with professional and technical guidance there will be established a Central Health Services Council and the Standing Advisory Committees.

The function of the Central Council is to advise the Minister upon such general matters as it thinks fit relating to the services provided under the Act or any services provided by local health authorities in their capacity as such authorities, and upon any questions referred to the Council by the Minister relating to those services.

3. The Council will consist of 6 *ex-officio* members, and 35 other members appointed by the Minister. The *ex-officio* members are the persons holding for the time being the offices of:

- President, Royal College of Physicians, London;
- President, Royal College of Surgeons, England;
- President, Royal College of Obstetricians and Gynaecologists;
- Chairman, Council of British Medical Association;
- Chairman, General Medical Council;
- Chairman, Council of Society of Medical Officers of Health.

The appointed members are:

- (a) 15 medical practitioners, of whom 2 are to be selected for their knowledge of mental illness and mental defectiveness;
- (b) 5 persons with experience in hospital management (not medical practitioners);
- (c) 5 persons with experience in local government (not medical practitioners);
- (d) 3 dental practitioners;
- (e) 2 persons with experience in mental health services;
- (f) 2 registered nurses;
- (g) 1 certified widow;
- (h) 2 registered pharmacists.

Before appointing these 35 members the Minister is required to consult such organizations as he may recognize as representative of the persons specified in paras. (a) to (h) above.

4. The Minister may, after consultation with the Central Council, by order vary the constitution of the Council.

5. The Minister is empowered to set up standing advisory committees to advise him and the Central Council on special aspects of the service. These committees will consist partly

of members of the Council and partly of persons who are not members of the council, and will be appointed by the Minister after consultation with the Council and with such representative organizations as the Minister may recognize.

In addition, the Central Council itself may appoint committees and the standing advisory committees may appoint sub-committees, and these bodies may include persons who are not members of the Council or standing advisory committees, as the case may be.

The function of a standing advisory committee is to advise the Minister and the Central Council upon such matters as it thinks fit relating to the services with which the committee is concerned, and upon any questions referred to it by the Minister or Central Council relating to those services. The committee may advise the Minister direct provided that it also informs the Central Council of the advice it has given, and the Council may express its views on that advice to the Minister.

6. The Central Council will make an annual report to the Minister on its work and that of the standing advisory committees, and the Minister is required to publish the report to Parliament, unless there is any reason of public interest for not doing so, when he may withhold it, in whole or in part, after consultation with the Council.

7. The Central Council will elect a chairman from its members. The chairman of a standing advisory committee will be elected by the committee. These bodies may regulate their own procedure.

PART II. HOSPITAL AND SPECIALIST SERVICES

8. It is made the Minister's general duty to provide hospital and specialist services of all kinds, including general and special hospitals, maternity accommodation, tuberculosis sanatoria, infectious disease units, provisions for the chronic sick, mental hospitals and mental deficiency institutions, accommodation for convalescent treatment and medical rehabilitation and all forms of specialized treatment. The services of specialists are to be available not only at hospitals, but also at health centres, clinics, and, if necessary on medical grounds, at the home of the patient.

Transfer of Hospitals to Minister

9. The ownership of the present public and voluntary hospitals, teaching and non-teaching, will pass to the Minister. The existing premises and equipment and other assets, including, in the case of non-teaching hospitals, endowments, will be transferred to the Minister, together with existing liabilities. In the case of teaching hospitals, which are those hospitals so designated by the Minister, the endowments will be transferred to the new Board of Governors.

Endowments

10. The Minister is to set up and administer a new hospital endowments fund, to which there will be transferred the endowments of non-teaching hospitals, with the exception of endowments of a capital nature given between the passing of the Act and the appointed day, which will be vested in the appropriate Hospital Management Committee. The disposal of the monies in this fund is to be the subject of regulations made by the Minister. Broadly, these regulations are to provide that the fund shall be used, firstly, for discharging existing debts and liabilities attaching to the voluntary hospitals concerned. Secondly, the capital value of the fund is to be apportioned among the regional hospital boards and hospital management committees constituted under the Act. The income of each portion will then pass to those boards and committees to be used at the discretion of those bodies, subject to such general conditions as may be prescribed. A Regional Board or Hospital Management Committee will also be empowered to draw on its portion of the capital for any purpose which the Minister approves. The Minister, Boards of Governors, and Hospital Management Committees are required to secure so far as is reasonably practicable that the objects of the transferred endowments and conditions attached to them are not prejudiced.

11. The Regional Boards, Boards of Governors of teaching hospitals and Hospital Management Committees are empowered to receive gifts or legacies and to hold property on trust for purposes relating to hospital services, including research.

12. If necessary for the purpose of the new service, the Minister may acquire, either by agreement or compulsorily, hospitals other than those transferred to him under the Act, together with their equipment.

Any medical institution which may be set up in future can be acquired by the Minister if required for the purposes of the new service.

Administration

13. The Minister, while assuming general responsibility for these hospital and specialist services, will entrust their administration to Regional Hospital Boards, and to Boards of Governors in the case of the teaching hospitals.

The Minister will, by order, constitute Regional Boards and determine the areas over which their jurisdiction will extend. So far as practicable, these areas or regions must be based on University Medical Teaching Centres.

14. The function of the Regional Hospital Boards is to undertake on behalf of the Minister the general administration of the hospital and specialist services in the region, subject to the Minister's general regulations and to such particular directions as he may give.

15. Each Regional Board is required to appoint, in accordance with a scheme to be ap-

proved by the Minister, local Hospital Management Committees, one for each large hospital or related group of hospitals forming a reasonably self-contained hospital service unit. The function of the Hospital Management Committee is to control and manage, on behalf of the Regional Board, a hospital or group of hospitals in accordance with regulations and such directions as may be given by the Minister or the Regional Hospital Board.

16. The Regional Hospital Board is to consist of a chairman appointed by the Minister and such other members so appointed as the Minister thinks fit, including:

(a) Persons appointed after consultation with the university with which the provision of hospital and specialist services in the area of the Board is to be associated;

(b) persons appointed after consultation with such organizations as the Minister may recognize as representative of the medical profession in the said area or the medical profession generally;

(c) persons appointed after consultation with the local health authorities in the said area; and

(d) persons appointed after consultation with such other organizations as appear to the Minister to be concerned.

The original members of the Board are also to include persons appointed after consultation with such organizations as the Minister may recognize as representative of voluntary hospitals in the area. It is laid down that at least two members of the Board shall be persons with experience in mental health services.

17. A Hospital Management Committee is to consist of a chairman appointed by the Regional Hospital Board, and such other members so appointed as the Board thinks fit, including:

(a) Persons appointed after consultation with any local health authority in the area;

(b) persons appointed after consultation with any Executive Council in the area;

(c) persons appointed after consultation with the senior medical and dental staff employed at the hospital or the hospitals in the area;

(d) persons appointed after consultation with such organizations as appear to the Board to be concerned.

Although exercising functions on behalf of the Regional Hospital Board, the Hospital Management Committees will be legal entities and may sue or be sued in their own right.

Teaching Hospitals

18. The Act makes special provision for teaching hospitals. A teaching hospital is defined as any hospital or group of hospitals which appears to the Minister to provide for any University facilities for undergraduate or postgraduate clinical teaching, and which after

consultation with the University concerned the Minister has designated as a teaching hospital.

19. The Minister is to constitute for each teaching hospital (or group) its own Board of Governors which will be responsible generally for administering the hospital on the Minister's behalf. The Board of Governors will consist of a chairman appointed by the Minister and such other members so appointed as the Minister thinks fit and of those members,

(a) not more than one-fifth shall be nominated by the university with which the hospital is associated;

(b) not more than one-fifth shall be nominated by the Regional Hospital Board for the area in which the hospital is situated;

(c) not more than one-fifth shall be nominated by the medical and dental teaching staff of the hospital; and

(d) other persons shall be appointed after consultation with such local health authorities and other organizations as appear to the Minister to be concerned, including, in the case of the original members of the Board of Governors of a teaching hospital designated before the appointed day, the governing body of any voluntary hospital comprised or to be comprised in the teaching hospital.

Medical and dental schools are not to be transferred to the Minister or to the Board of Governors of the teaching hospital with which they are associated. The governing bodies of these schools will continue to own and administer their property and the Act provides for the transfer of any existing hospital property held for school purposes to these governing bodies.

Private Accommodation in Hospitals

20. The Minister is empowered to provide separate pay bed accommodation at hospitals within the service for private patients who are prepared to pay the whole cost of private maintenance and attendance. Specialist and general practitioners who are members of the staff of a hospital within the service, whether in an honorary or paid capacity, will be able to treat private patients in such accommodation and to charge fees subject to a maximum scale which will be fixed by regulations made by the Minister. Where there are single rooms or small wards in hospitals the Minister is empowered to make them available to patients who wish to buy greater privacy by paying the extra cost of the accommodation involved. The provision of such accommodation for private patients is subject to the over-riding right of other patients to be admitted to it without payment if medical considerations urgently require it.

Hospital Staff

21. The staffs of all hospitals in the service will be in the employment of the Regional

Boards or Boards of Governors of teaching hospitals, as the case may be. Regulations will be made by the Minister governing the qualifications, conditions of service and remuneration of all classes of hospital staff. Before making these Regulations the Minister will consult organizations representing the staffs concerned. Special Regulations are to be made relating to the appointment of hospital medical and dental officers. These Regulations will require the advertisement of vacancies and the constitution of Advisory Appointments Committees to make a selection of candidates from whom the appointments will be made by the Regional or Teaching Hospital Board.

Ancillary Services

22. The Minister is authorized:

(1) to provide a bacteriological service (including laboratories) for the control of the spread of infectious disease;

(2) to provide a blood transfusion service;

(3) to conduct or to assist research relating to the causation, prevention, diagnosis or treatment of illness or mental defectiveness.

Boards of Governors of teaching hospitals, Regional Hospital Boards, and Hospital Management Committees are also authorized to conduct research.

PART III. HEALTH SERVICES PROVIDED BY LOCAL HEALTH AUTHORITIES

23. The provision of the services listed below will be a statutory duty of local authorities which for the purpose of this part of the Act are the County and County Borough Councils and are designated "local health authorities".

(a) Health Centres.—The provision, equipment, and maintenance of health centres and of the necessary staff other than medical or dental practitioners;

(b) Maternity and Child Welfare.—The functions of existing welfare authorities which are not County or County Borough Councils will be transferred to the local health authorities, with a power of delegation for child welfare only parallel to that empowered by the Education Act, 1944. The specialist and institutional aspects of maternity will be the responsibility of the regional hospital board;

(c) Domiciliary Midwifery.—A domiciliary midwifery service. Local Health authorities will become the local supervising authorities under the Midwives Acts. The section of the Midwives Act, 1936, which enables the Minister to prescribe conditions subject to which fees are to be payable to medical practitioners called in by midwives, is amended to empower the Minister to prescribe conditions as to qualifications of such medical practitioners;

(d) Health Visiting.—The provision of health visitors for home visiting for the purpose of giving advice as to the care of young children, persons suffering from illness and expect-

ant or nursing mothers, and as to the measures necessary to prevent the spread of infection;

(e) Home Nursing.—Provision for the attendance of nurses on persons who require nursing in their own homes;

(f) Vaccination and Immunization.—Arrangements for persons in the area to be vaccinated against smallpox or immunized against diphtheria. The local health authorities will have power to do the same for other diseases and a duty to do so if directed by the Minister. The present law on compulsory vaccination is repealed. In making their arrangements local authorities are required to give medical practitioners providing general medical services under the Act the opportunity of providing these vaccination and immunization services;

(g) Ambulance Services.—The provision of ambulances and other means of transport.

24. In addition, local health authorities will be empowered to provide home help services and to make arrangements "for the purpose of the prevention of illness", and for the care and after care of persons suffering from illness or mental defectiveness.

25. Each local health authority is required within a specified period to submit to the Minister its proposals for carrying out the requirements of the Act. The proposals must also be conveyed to the Regional Boards and Boards of Governors, to the Executive Council, to any voluntary organization which is providing similar services in the area and to every local authority whose area forms part of the area covered by the local health authority. Any of these bodies may make recommendations to the Minister for modifying the proposals, provided that copies of such recommendations are sent to the local health authority. The Minister may approve the local health authority's proposals with or without modifications and it will be the duty of the authority to carry out the scheme as approved.

Statutory Health Committees

26. Local health authorities will be required to appoint statutory health committees and to refer to them all matters relating to the discharge of their functions under the Act other than the power to borrow money or to levy rates. The health committee may establish sub-committees at their own discretion and appoint by co-option non-members of the committee or sub-committee, subject to the proviso that a majority of the committee or sub-committee are members of the authority.

PART IV. GENERAL MEDICAL AND DENTAL SERVICES, PHARMACEUTICAL SERVICES AND SUPPLEMENTARY OPHTHALMIC SERVICES

Executive Councils

27. This part of the Act covers personal health services provided by general practitioners ("general medical services") and dentists and the supply of drugs, medicines and appliances.

The duty of arranging for the provision of these services is placed upon new local bodies to be called executive councils, one of which will be established for the area of each county or county borough; at the Minister's discretion a single executive council may be established for the area of two or more local executive councils. The executive council is to consist of thirteen members appointed by the Minister and local authorities and twelve appointed by the profession as follows:

(a) A chairman and four members appointed by the Minister;

(b) eight members appointed by the local health authority for the area of the executive council;

(c) seven members appointed by the Local Medical Committee;

(d) three members appointed by the Local Dental Committee;

(e) two members appointed by the Local Pharmaceutical Committee.

28. The Minister has power to vary the constitution of an executive council or to establish a joint committee for the area of two or more executive councils to exercise some but not all of the functions of an executive council.

29. The main function of the executive council is to enter into contract with general medical practitioners, with dental practitioners and with pharmacists for the provision (at a health centre or otherwise) of general medical, dental and pharmaceutical services in accordance with regulations to be made by the Minister. The regulations are to include provision for

(a) the preparation and publication of lists of persons who undertake to provide these services;

(b) conferring a right on any person to choose the medical or dental practitioner by whom he is to be attended, subject to the consent of the practitioner so chosen and, in the case of medical services, to any prescribed limit which may be placed on the number of patients to be accepted by any practitioner;

(c) the distribution or allocation among medical practitioners who enter into contract with the executive council of persons who desire to obtain general medical services but who do not choose a medical practitioner or have been refused by the practitioner chosen;

(d) the issue of medical certificates.

30. Executive councils are also required to make arrangements with medical practitioners and opticians having the prescribed qualifications for sight-testing and the supply of optical appliances. Those services are referred to as "supplementary ophthalmic services" and their provision by executive councils is without prejudice to the ophthalmic services, clinic and other, to be provided by regional boards as part of the hospital and specialist arrange-

ments. The Minister, however, is empowered to abolish the supplementary scheme administered by the executive councils as soon as he is satisfied that adequate ophthalmic services are available through the hospital and specialist services provided under Para II of the Act.

31. The Minister has wide powers to make regulations with regard to the procedure of executive councils, including the appointment of committees, which may consist wholly or partly of members of the council, and the delegation of functions to such committees.

Control of Distribution

32. Only medical practitioners who are engaged in medical practice (otherwise than as paid assistants) are entitled as of right to provide general medical services under the Act. This right is conditional upon the practitioner making application before the appointed day* to the executive council of any area in which he is practising to be included in the list of practitioners undertaking to provide general medical services for persons in that area.

33. After the appointed day any doctor who wishes to join the public service for the first time or, if he is already in it, to go to and practise in a new area will be required to obtain the consent of the Medical Practices Committee—a new central body appointed by the Minister. This body is to consist of a chairman (a medical practitioner appointed by the Minister) and eight other members, of whom six shall be medical practitioners and at least five of whom are actively engaged in medical practice. The only ground for refusal of the Medical Practices Committee's consent is that the number of practitioners undertaking to provide general medical services in the area or part of it concerned is already adequate.

34. When a practice becomes vacant or when, in the opinion of the Medical Practices Committee, there is a need for additional practitioners in a particular area and the number of applicants exceeds the number of vacancies, the Medical Practices Committee will select the person(s) whose application(s) is (are) to be granted and will refuse the other applications. Before making its selection the Medical Practices Committee is required to consult the executive council concerned and that body, before expressing its view on the person(s) to be selected, is required to consult the Local Medical Committee for the area (i.e., the Committee recognized by the Minister as representative of the local medical profession). Although the Medical Practices Committee is precluded from refusing the application except on the ground that there is an adequacy of practitioners, it

* "Appointed day" means such day as His Majesty may by Order-in-Council appoint, and different days may be appointed for the purpose of different provisions of the Act.

may grant an application subject to the condition that the applicant is excluded from practising in a specified part or parts of an area.

35. The medical practitioner whose application has been refused or granted conditionally has a right of appeal to the Minister. The Minister, may, if he allows the appeal, direct either that the application shall be granted in addition to the applications already granted or that it shall be granted instead of such one of those applications as the Minister may specify. The Medical Practices Committee and, in appeal cases, the Minister, are to have regard to the wishes of an applicant to practise with other practitioners in an area, to any desire expressed by existing practitioners to take an applicant into practice, and special regard to family relationships.

Prohibition of Sale of Medical Practices

36. Section 35 of the Act makes it unlawful to sell the goodwill or any part of the goodwill of the practice of a doctor entering the public service on or after the appointed day. Thereafter, a practitioner buying or selling such goodwill is liable to criminal proceedings, and, if found guilty, to imprisonment of up to three months and/or a fine up to such amount as will secure that he derives no benefit from the offence and a further amount of £500. This prohibition, however, does not cover the case of a medical practitioner whose name has ceased to be on the list of any executive council and who practises in the area of an executive council in whose list his name has never been entered.

A prosecution for an offence under this section can only be instituted by or with the consent of the Director of Public Prosecutions and a person so charged will be entitled to trial by jury at Quarter Sessions or Assizes.

37. There are enumerated in this section of the Act a number of transactions, any of which is deemed for the purposes of the Act to be the sale of the goodwill of a medical practice. For example: (1) if an assistant is employed for substantially less remuneration than his services "might reasonably have been expected to be worth" and subsequently becomes a partner of his employer, an offence is committed; (2) if doctors in the service are in partnership and agree to share in unequal proportions the income of the partnership they will be liable to be prosecuted if it is held that the partner who takes less than the other(s) is receiving substantially less than his services might reasonably have been expected to be worth at the time when the agreement was made; (3) a doctor's widow who knowingly sells his house to a practitioner for substantially more than the sum the house might have fetched if it had not been used for practice purposes commits an offence.

38. Subsections 9 and 10 of Section 35 of the Act give a medical practitioner or his personal representative an opportunity of ascertaining in

advance whether a proposed transaction in the opinion of the Medical Practices Committee involves the sale of goodwill. If this Committee considers that the transaction does not involve the giving of any consideration in respect of goodwill it is required to issue to the applicant a certificate to that effect. Where a transaction results in a person being charged with an offence under this section of the Act, it is a defence to the charges to prove that the transaction was certified by the Medical Practices Committee unless the Court holds that the applicant for the certificate failed to disclose to the Committee all the material circumstances or made any misrepresentation—in which case the Court may disregard it.

Where a medical practitioner practises in partnership, the term "goodwill" is to be considered as referring to his share of the goodwill of the partnership practice.

Compensation

39. The Act makes it unlawful to sell the goodwill of the practice of a doctor entering the public service after the appointed day. Doctors who join the service at the outset will be entitled to compensation in respect of the loss incurred through being unable thereafter to sell their practices. The doctor who because of age or infirmity or both does not enter the service on the appointed day will be entitled to compensation just as if he had entered. Doctors who join the service after the appointed day will not qualify for compensation.

The practice of any doctor who dies or retires from practice between the passing of the Act and the appointed day, which has not been sold in the meantime, will qualify for compensation. If compensation is paid the practice will be regarded as having come within the service at the appointed day.

40. The aggregate amount of compensation for which provision is made in the Act is £66,000,000 and this sum will be apportioned between England and Wales on the one hand and Scotland on the other. The sum—

(a) is based on the Government's estimate that 17,900 principals will enter the National Health Service;

(b) will not be subject to increase if in fact more than 17,900 principals so enter;

(c) will be subject to reduction if the number of principals so entering is below 17,700; the reduction for each principal in defect of 17,700 to be 1/17,900 of £66,000,000.

41. Regulations will govern the detailed method of apportioning the global sum among the doctors entitled to compensation and the manner and times at which it is to be claimed and paid. The Minister is required to consult such organizations as he may recognize as representing the medical profession before making these regulations. The regulations are

to provide that as a general rule compensation will not be paid until the retirement or death of the medical practitioner concerned, whichever first occurs. In the meantime interest on the compensation due at the rate of $2\frac{3}{4}\%$ per annum will be paid in respect of the period from the appointed day until the time when the compensation is paid. In exceptional circumstances the compensation payment may be made earlier and the Minister has made it clear in his White Paper (Cmd. 6761) and in public announcements that the exceptional circumstances will include cases where hardship (*e.g.*, through outstanding debts in connection with the practice) would otherwise arise.

Pharmaceutical Services

42. Executive councils will make arrangements for the supply of drugs, medicines and appliances to persons in their area who are receiving general medical services, if ordered by a medical practitioner rendering those services. It appears that a patient will not be able to obtain drugs, medicines and appliances under this arrangement unless they are ordered by a practitioner who has joined the service.

General Dental Services

43. All dental practitioners who undertake to provide general dental services under the Act will be in contract with an executive council. Their position will be generally analogous to that of medical practitioners on the executive council list save that there are no provisions with regard to the prohibition of the sale of goodwill or compensation for that loss; neither does the clause regulating the distribution of medical practitioners who enter the service apply to dental practitioners who enter the service.

Disqualification of Practitioners—the Tribunal

44. A special tribunal is to be set up to investigate cases where representations are made either by an executive council, or, if the tribunal thinks fit, by any other person that the continued inclusion of any doctor, chemist, dentist or optician in the lists drawn up by the executive council would be prejudicial to the efficiency of the service. The tribunal will consist of a chairman, who must be a practising barrister or solicitor of not less than ten years' standing, appointed by the Lord Chancellor and will in each case include a member of the same profession as the person who is the subject of the enquiry and one other member. The "other member" will be appointed by the Minister after consultation with such associations of executive councils as he may recognize as representative of those bodies. The "professional" member will be one of a panel of six persons appointed by the Minister after consultation with such organizations as he may recognize as representative of the several professions concerned. The panel will consist of a medical practitioner, a dental

practitioner, a registered pharmacist, a medical practitioner practising as an oculist, a sight-testing optician and a dispensing optician. Regulations will provide that the practitioner who is the subject of an enquiry shall have the opportunity of being heard in person, of being represented by counsel, solicitor or otherwise, of calling witnesses and producing other evidence, and of requesting that the hearing shall be in public.

45. The tribunal is bound to inquire into a case in which representations are received from an executive council, but where representations emanate from any other source the tribunal has discretion as to whether an inquiry should be held. Where the tribunal is satisfied that the continued inclusion of a person in any list to which the representations relate would be prejudicial to the efficiency of the service, it will direct the executive council concerned to remove from that list the name of the doctor, dentist, chemist, or optician. Where the tribunal so decides, a similar direction can be applied to all lists in all areas. The practitioner concerned may appeal to the Minister from any direction of the tribunal and the Minister may confirm or revoke that direction. When a practitioner's name is removed from the list or lists in question, he is disqualified for inclusion in any list to which the direction relates until such time as the tribunal or the Minister directs to the contrary. A practitioner who has already been disqualified from participation in the present National Health Insurance Scheme and whose disqualification has not been removed before the appointed day will not be entitled to participate in the new service.

Powers of Minister where Services are Inadequate

46. If the Minister is satisfied, after such inquiry as he may think fit, that the services provided by doctors, dentists, or chemists in any particular area are not adequate, he is empowered to take such steps as he considers necessary to secure an adequate service.

Postgraduate Courses

47. The Minister is empowered to arrange with universities and medical and dental schools for the provision of refresher courses for doctors, dentists, and others in the service and to contribute towards the cost of these services and the expenses of persons attending them.

Disputes

48. Any dispute arising under this part of the Act or under any regulation made under this part of the Act, whether between an executive council and a person receiving services or between an executive council and a local health authority as to the conduct of a health centre, is to be referred to and decided by the Minister.

PART V. MENTAL HEALTH SERVICES

49. The Act transfers to the Minister of Health the present administrative functions of the Board of Control in regard to mental health, the Board retaining only its quasi-judicial functions connected with the liberty of the subject. The general transfer of hospitals to the Minister includes the present mental hospitals and mental deficiency institutions. The main mental treatment and mental deficiency services are to be a part of the new hospital and specialist arrangements under the Act. Local health authorities, however, are given responsibility for the ascertainment of mental defectives and their supervision when they are living in the community, and for the initial proceedings for placing under care those who require treatment under the Lunacy and Mental Treatment Acts.

PART VI. GENERAL

50. This part of the Act deals with financial arrangements and miscellaneous administrative matters, the more important of which are set out below:

(a) Finance

Except that certain charges may be made for the provision and renewal of appliances and for accommodation in private wards the service will be free to all who care to use it. The Exchequer will be responsible for the full cost of the hospital and specialist services and of the general practitioner, dental, ophthalmic and pharmaceutical services together with the cost of central administration and will also pay approximately one-half of the cost of the various services to be administered by the local health authorities.

(b) Default Powers of Minister

If in the Minister's opinion any of the various bodies constituted under the Act have failed to carry out any of their functions under the Act or to comply with any of the regulations or directions he may, after inquiry, declare that body to be in default and direct them as to the time and manner in which the default is to be remedied.

(c) Qualifications, Remuneration, and Conditions of Service of Officers

These will all be governed by regulations to be made by the Minister.

(d) Superannuation

The Minister has power to make regulations granting superannuation benefits on a contributory basis to officers of the various bodies constituted under the Act and to medical practitioners and dental practitioners providing general medical or dental services.

(e) Transfer and Compensation of Officers

The Act requires regulations to be made providing for the transfer to the appropriate authority under the new service of officers employed immediately before the appointed day by hospitals, insurance committees, and local authorities. In the case of honorary officers of a hospital, the position is obscure as the transfer of these officers is subject to such exceptions and conditions as the Minister may prescribe. Compensation will be payable, subject to certain exceptions or conditions to be prescribed, to officers whose functions are transferred or are extinguished by the Bill if they were previously employed whole-time and suffer loss of employment or loss or diminution of emoluments or of superannuation or similar rights which is shown to be directly attributable to the Act. The amount of compensation and the basis of its ascertainment are not specified in the Act but are left to be settled by regulations.

Regulations and Orders

51. A wide field remains to be covered by Regulations and Orders which the Minister is empowered to promulgate by the Act. All Regulations to be made under the Act are subject to Parliamentary control, but unless there is provision to the contrary Orders are not subject to Parliamentary control. Parliamentary control is exercised in two ways:

1. by affirmative resolution; regulations subject to this are ineffective until the House has positively approved them;
2. by negative resolution; regulations subject to this, though required to be laid before Parliament immediately they are made, become operative at once and, unless Parliament within forty days resolves that they be annulled, have statutory effect as if they were incorporated in the Act.

52. Of the Act's 80 clauses and 10 schedules, 40 confer on the Minister the power to make regulations or orders. The only regulations in the National Health Service Act which require an affirmative resolution of Parliament before they become operative are those dealing with (1) superannuation and (2) the transfer and compensation of officers of hospitals, local authorities, and insurance committees.

53. Among the matters, many of them of fundamental importance, to be settled by regulations which do not require an affirmative resolution are:

- (a) the control and management of the Hospital Endowment Fund;
- (b) the functions of Regional Hospital Boards, Boards of Governors of Teaching Hospitals and Hospital Management Committees;
- (c) the appointment of medical and dental staffs of hospitals;

(d) the arrangements to be made by executive councils with doctors, dentists, opticians, and pharmacists for the provision of services to patients;

(e) the functions of executive councils in relation to filling vacancies in medical practice and the procedure for applications to the Medical Practices Committee and for appeals to the Minister;

(f) the extent to which executive councils shall consult with Local Medical, Pharmaceutical, and Dental Committees;

(g) the apportionment of the compensation global sum and the manner and time at which claims and payments are to be made;

(h) the procedure of the tribunal dealing with the disqualification of practitioners;

(i) the arrangements for the use of health centres by medical and dental practitioners;

(j) the qualifications, remuneration and conditions of service of officers;

(k) the appointment, tenure of office, and payment of:

(i) members of the Central Health Services Council and standing advisory committees;

(ii) members of Regional Hospital Boards, Hospital Management Committees, Boards of Governors of Teaching Hospitals and of committees of those bodies and the procedure of those bodies;

(iii) members of executive councils and of committees of those councils, their officers and procedure;

(iv) members of the Medical Practices Committee;

(v) members and officers of the Tribunal;

(l) the recovery of charges for certain appliances and special dental treatment;

(m) grants to local health authorities;

(n) payments to Regional Hospital Boards, Boards of Governors, executive councils, and other bodies.

54. Orders are administrative acts of the Minister and do not come before Parliament in either of the ways applicable to Regulations, unless the Act so specifies.

The only Orders which the Act specifies as being subject to a negative resolution are those

(1) varying the constitution of the Central Health Services Council;

(2) determining the areas for which the Regional Hospital Board will be responsible.

(3) amending or repealing local acts and charters which are redundant or inconsistent with the Act.

55. The matters on which the Minister has power to make Orders which are not subject to Parliamentary review include:

(a) the constitution of standing advisory committees of the Central Health Services Council;

(b) the constitution of Regional Hospital Boards;

(c) the designation of hospitals as teaching hospitals and the constitution of Boards of Governors;

(d) the constitution of joint boards for the areas of two or more local health authorities;

(e) the constitution of a single executive council for the areas of two or more local health authorities;

(f) the variation of the constitution of a local executive council;

(g) the constitution of a joint committee for the area of two or more executive councils for the purpose of exercising some, but not all, of the functions of the executive council;

(h) the termination of the arrangement for the provision of supplementary ophthalmic services by an executive council;

(i) the exercise of default powers against local health authorities and any of the bodies constituted by the Act—the various hospital bodies; executive councils, and others—if they are not carrying out their functions or failing to comply with any regulations or directions relating thereto;

(j) the acquisition compulsorily of land required by the Minister for the purposes of the Act.

THE PROFESSION AND THE ACT

56. Prior to the publication of the National Health Service Bill, the Negotiating Committee of the profession formulated and published a series of principles in which were expressed in general terms the basic tenets of the profession on the subject of the organization of the country's medical services. These principles are as follows:

I. The Medical profession is, in the public interest, opposed to any form of service which leads directly or indirectly to the profession as a whole becoming full-time salaried servants of the State or local authorities.

II. The medical profession should remain free to exercise the art and science of medicine according to its traditions, standards, and knowledge, the individual doctor retaining full responsibility for the care of the patient, freedom of judgment, action, speech and publication, without interference in his professional work.

III. The citizen should be free to choose or change his or her family doctor, to choose, in consultation with his family doctor, the hospital at which he should be treated, and free to decide whether he avails himself of the public service or obtains the medical services he needs independently.

IV. Doctors should, like other workers, be free to choose the form, place, and type of work they prefer without governmental or other direction.

V. Every registered medical practitioner should be entitled as a right to participate in the public service.

VI. The hospital service should be planned over natural hospital areas centred on universities in order that these centres of education and research may influence the whole service.

VII. There should be adequate representation of the medical profession on all administrative bodies associated with the new service in order that doctors may make their contribution to the efficiency of the service.

57. An examination of the Act in relation both to these principles and to more detailed expressions of policy reveals wide divergences between the provisions of the Act and the principles of the profession.

58. The profession is opposed to any development which tends to convert its members into full-time salaried servants of the State or local authorities. Government speakers have confirmed that a full-time salaried service is their objective, although they admit that such a service is inconsistent with free choice of doctor and not practicable at the present time.

59. Under the proposals of the Act consultants and specialists will become salaried officers of regional bodies appointed by the Minister, undertaking all their hospital work in hospitals owned by the State. General practitioners no longer owning the goodwill of their practices, will be, to an extent yet to be determined, salaried employees of the State through local councils.

60. The profession has urged that there should be proper co-ordination and correlation of the country's medical services, both centrally and locally. Central departmental responsibility for health services remains divided amongst a number of different departments. Locally, the Act establishes not one but three administrations with insufficient co-ordination between them.

61. The hospital provisions, although creating what the profession has long desired—a powerful regional organization—may tend to destroy local interest and initiative and so affect adversely the capacity of a hospital for innovation and experiment, its power to attract nursing and other staff and the confidence of the local people in their local hospital.

62. In the field of general practice the profession has expressed the views:

(1) that general practitioners should retain the goodwill of their practices;

(2) that there should be no governmental control over doctors in regard to the areas in which they practise;

(3) that, except where special circumstances justify it, remuneration should be by capitation payments in proportion to the number of persons on a doctor's list.

The Act provides for the abolition of the custom of buying and selling general practices and for the establishment of a machinery of negative direction over the movement of general practitioners, while the profession maintains that the ownership of goodwill is essential to the continued freedom of the general practitioner. This abolition is regarded as a first and substantial step to a State salaried service while the system of "negative direction" which is proposed is an unjustifiable and unnecessary interference with the freedom of the doctor. Any necessary improvement in the distribution of doctors can be achieved on the existing basis of general practice.

63. The abolition of the custom of buying and selling practices creates more problems than it solves. An inevitable consequence of abolition is that the sale of practices for which compensation is paid should be illegal. But in addition to such prohibition the Act contains a series of definitions of offences so wide in their scope and so abstruse in their terminology as to be likely to be unjust in their application, despite the provision for some measure of protection by registration.

64. Though it appears to be contemplated that practitioners will work in partnership, such partnership will involve the risk of prosecution in every case in which the partners agree to share the income in unequal proportions, unless they obtain in advance a certificate from the Medical Practices Committee. The Act gives no guidance as to the basis upon which the services performed by any partner should be estimated or as to the factors which may properly be taken into account, except that regard is to be paid to the circumstances at the time when the agreement was made.

65. In the case of an assistant who subsequently succeeds to the practice of his principal, the principal is deemed to have sold the goodwill of his practice to the assistant if the remuneration paid to the assistant was substantially less than his services might reasonably have been expected to be worth.

66. Even though the global compensation sum of £66,000,000 includes no allowance for the loss of goodwill in relation to doctors' houses, a practitioner who sells his house to another practitioner with the knowledge that it will be used for practice purposes is liable to prosecution and, if convicted, to heavy fine and imprisonment if the purchase price is "substantially in excess" of the price which might reasonably have been expected if the house had not been used for practice purposes. It is impossible to foretell what interpretation a court might place on the words "substantially in excess". If premises are conveniently situated for a medical practice and have been used for a medical practice for many years a valuation of the premises upon the footing that they have never been so used would present a difficult problem to an

expert valuer, and an even more difficult problem to a medical practitioner. A practitioner's widow or other personal representative (*e.g.*, the Public Trustee or a Bank), would be confronted with similar difficulties when disposing of his house, bearing in mind that the most likely purchaser would be another medical practitioner.

67. Doctors who do not join the service by the appointed day will not qualify for compensation. The general practitioner must make this decision at the outset, before he has an opportunity of learning the wishes or inclinations of his patients. If he stays outside the service he may lose all his practice goodwill and will forfeit for ever his title to compensation. His patients will be penalized, as medicine and appliances will not be provided free under the Act to those patients who are not under the care of a doctor who has joined the service. It is difficult to reconcile this with the claim advanced in the Government White Paper that "all the service, or any part of it, is to be available to everyone. . . ."

68. The Minister's expressed determination to introduce a salary element in the remuneration of all general practitioners, whether special circumstances justify it or not, is further evidence of movement towards a full salaried service. A registered medical practitioner will not be able as of right to enter the new service.

69. The Act involves an excessive concentration of power in the hands of the Minister. He will appoint the Central Health Services Council and its committees. He will appoint the Regional Hospital Boards who will in turn appoint the Hospital Management Committees. He will determine by Regulation a wide variety of issues including mode and amount of remuneration. He will determine the issue of the continuance of a practitioner in the general medical service without a right of appeal to the Courts. The majority of Regulations the Minister makes will become law from the moment he makes them, subject only to their annulment by a Prayer in the House of Commons. He will deal with many important subjects by Orders which are not subject to Parliamentary control.

70. The profession has for years been pressing for a really satisfactory health and medical service. Although the constructive proposals of the profession are reflected in certain sections of the Act, yet in many important respects it is in substantial conflict with the views hitherto expressed by the medical profession, both in such general terms as in the statement of principles and in the more detailed terms of the expressions of policy of the representative professional bodies. The independence of medicine is at stake.

MEN and BOOKS

THE PRAYER OF A PHYSICIAN*

(Dedicated to the memory of Rabbeinu
Moses-ben-Maimon)

Mordecai Etziony, M.A., M.D.
Montreal, Que.

To Thee, O great Arcane,
Creation's Force and Source,
Of nature Fons et Origo,
Prime Mover! —
—O be-Thou-what-Thou-be! —
To Thee, in my dire helplessness,
I make my prayer.

Not for the sake of fame desired,
Nor yet for fortune's sake,
But for the sake of those who in delirium cry,
And those who in their agony lie broken,
I do address myself to Thee.

O, not—forfend it!—that I envy Thy might
And of Thy wisdom am jealous,
I plead, but for the sake of flesh that is wounded,
And limbs that move not
I send my prayer to Thee.

Thou who hast poured of Thy wisdom
Upon the heads of Pasteur, Hippocrates,
And on Maimonides,
Fount of philosophy,
Accept my plea!

Do make sharp my senses
That without error or confusion
They may perceive.
Make clear to my sight
The body's eloquent flaws, its diagnostic rash,
And from my hearing
Let not the least stutter of the pulse
Escape.

Make them strong and hale,
The twelve-score-and-eight members of my frame!
Teach them to serve me
Altogether and in harmony:
When I fare forth to the sick-bed,
Let them not tremble, my hands;
Nor my feet, stumble.

So that I choose, straightway, and without doubt,
The remedy to follow the disease,
Make straight my judgment.
Make straight my judgment that I may know,
And keen my perception that I may recognize
Each illness in its particularity.
Let no invalid by my error be undone.

* This prayer was written originally both in Hebrew and Yiddish at the time of the author's graduation in medicine. The translation has been rendered from the Yiddish by the Canadian poet, A. M. Klein. [EDITOR]

To others' pain, make sensitive my soul,
And to another's anguish open my heart.
And O—if the healing of mine enemy is in my
hand,
Cleanse me of hatred.

Preserve me, Thou great Healer,
From envying my fellow his leechcraft,
His scope and reach.
May his insight and inventions bring
Joy and well-being
Also to me.

Source of all Truth!
Aid me against stiff-neckedness and pride.
Teach me humility to know
The angle of my own shortsightedness.
And never let—O never let
An ill man through my error be undone,
Nor through that error, Thy holy name be
soiled.

And grant, grant that the courage and self-
sacrifice,
Which shone up through the lives
Of Koch, Ricketts, and Noguchi,
Illumine also my dark path.

4873 Park Ave.

ASSOCIATION NOTES

The Seventy-eighth Annual Meeting, Winnipeg, June 23 to 27, 1947

In order to offset the shortage of room space in the hotels of downtown Winnipeg for the Seventy-eighth Annual Convention, the University of Manitoba has generously offered the use of its Main Residence.

This beautiful building is situated on the campus of the University amongst some of Manitoba's loveliest trees. Close by the Red River makes a wide loop as it flows towards the City. The Residence is a three story, fire-proof building, of brick and stone construction. The stone is from the famous Tyndall Quarries, which supplied the material for the Legislative Building. A number of commodious reception rooms are available for guests. There is a large dining room with a modern cafeteria. The latter was opened in the autumn of 1946. The University will serve breakfast only, as it was felt that guests would prefer to get lunch and dinner downtown.

The Residence has been completely redecorated within the past year and fluorescent lighting installed in the rooms and hallways. The rooms are large, will accommodate two persons, and are equipped with single beds. Bedding is supplied but guests are asked to bring their own towels. Each floor of the

Residence has ample lavatory and bathroom facilities. After the clamour and heat of a day spent in a modern city the quiet security of this beauty spot of Manitoba should please all those who seek a good night's rest.

Rapid motor coaches give quick service from the Residence to Convention Headquarters. Guests who have their own cars will find ample parking space within a minute's walk from the Residence.

The Committee on Housing has a central registry for guests desiring accommodation for the Convention. In writing for room space, please indicate preference for Hotel or Residence accommodation. The address is 505 Medical Arts Building, Winnipeg. It is unnecessary to add that the committee will do all possible to meet the wishes of our guests but, due to the aforementioned shortage of hotel rooms, the Committee on Housing cannot guarantee that the applicant's wishes on accommodation can be met.

MEDICAL SOCIETIES

Academy of Medicine, Toronto

Dr. Omond M. Solandt recently addressed the Academy of Medicine, Toronto, on the effects of the atomic bomb at Hiroshima. He described three types of effect on the sufferer,—(1) killing or injury by the blast; (2) obvious visible burns on the skin which assume some bizarre shapes such as the pattern of the dress; and (3) radiation burns whose effects appear some time later. In round figures, 50,000 were killed, another 50,000 were injured, and others showed some effects. Pregnant women within 3,300 feet of the bomb burst had miscarriages and none of the children born within a mile of the blast survived. Of the children born within twenty miles of the bomb, only a third were normal and survived. Many of the men near the bomb area were later found to have become sterile. If a bomb this size were dropped on Toronto, its effect would be felt from the Lakeshore to Eglinton Avenue. Dr. Solandt felt that the best defence against the bomb would be to stop war itself.

Dr. Solandt is Director General of Defence Research, Department of National Defence, Ottawa. He has a brilliant record in research.

District Medical Society No. 7, Alberta

A meeting of District Medical Society No. 7 was held at the Provincial Mental Hospital, Ponoka, on Friday, November 15, 1946. In spite of the sudden change in the climatic conditions the meeting was well attended. Dr. R. R. Maclean, Medical Superintendent of the Hospital, opened a discussion on the topic of "Neurosypilis". He outlined the history of neurosypilis since the opening of the hospital in 1911. His statistics showed the marked reduction in mortality as present day treatment evolved.

Dr. T. C. Michie followed with his paper on the "Incidence of neurosypilis", and Dr. Murray, also of the hospital, discussed the treatment as practised in the hospital. Dr. J. M. Byers presented a series of case histories illustrating the various phases of sypilis of the central nervous system.

A letter from Dr. A. F. Perl, of Provost, was read in which he regretted that the facilities at Provost were

inadequate for the holding of the January meeting of the society, as had been previously proposed. Dr. N. Bradley of Wetaskiwin proposed that the next meeting be held in Wetaskiwin in the month of January. This was agreed on, the exact date to be arranged later.

Brandon and District Medical Society

A well-attended meeting of the Brandon and District Medical Society was held in Brandon Mental Hospital on November 6. Approximately eighty were present at the dinner after which Dr. S. J. S. Peirce gave an amusing and enlightening speech on "Hobbies".

At the scientific session in the evening, presided over by Dr. R. O. McDiarmid, Dr. R. P. Cromarty was named as representative on the Executive of the Manitoba Medical Association. Dr. M. T. Macfarland, the newly appointed executive secretary of the Manitoba Medical Association, was introduced and responded briefly. Dr. C. H. A. Walton, Winnipeg, gave an address on "Hypertension". Dr. A. L. Paine, Superintendent of Manitoba Sanatorium, Ninette, spoke on the protection of nurses from tuberculosis; Dr. C. B. Stewart, Winnipeg, on "Disorders of the prostate gland"; and Dr. W. H. Thorleifson, Brandon, on "Arthritis", illustrating his remarks with numerous slides.

ROSS MITCHELL

Guelph Medical Society

Dr. D. R. Mitchell, Toronto, spoke to the Guelph Medical Society at the Cutten Golf Club, Guelph, on October 30, 1946, on the subject of "Hæmaturia". Twenty-three of the twenty-nine members of the Society attended this dinner and scientific meeting.

Lanark County Medical Society

The Lanark County Medical Society held their Annual Meeting at Carleton Place, Ontario, and Dr. J. C. Samis of Ottawa, presented an address on "Injuries to the hand". Dr. Muirhead, the Secretary of the Society, reports that the doctors present enjoyed the evening very much and obtained new views regarding the surgery of the hand. This meeting was further addressed by Dr. Fred Snedden, lately returned from India where he has been for the last eight years with the Royal Army Medical Corps. He outlined for the meeting certain aspects of the country and the ways of the people there. The following officers were elected for the year 1947: Dr. J. F. Dunn, Almonte, President, and Dr. W. R. Muirhead, Almonte, Secretary.

Manitoba Hospital Association

The 25th Annual Meeting of the Manitoba Hospital Association was held in the Royal Alexandra Hotel, Winnipeg, on November 2, under the presidency of Dr. O. C. Trainor. A request was forwarded to Rt. Hon. C. D. Howe that the practice of employing members of the nursing profession for stewardess work on airplanes be discontinued. A resolution was sent to the provincial government asking for compulsory pasteurization of milk for human consumption. The federal minister of national health and the provincial minister of health and public welfare will be asked to make funds available through government subsidies to assist in the operation of schools of nursing. A request for revision of the dominion income tax exemption for married women working in hospitals will be forwarded to the federal government.

Dr. O. C. Trainor, Winnipeg, was re-elected President. Other officers are: *Hon. President*—Hon. Ivan Schultz, Minister of Health and Public Welfare; *First Vice-president*—Judge J. M. George, Morden; *Second Vice-president*—Dr. G. S. Williams, Winnipeg; *Treasurer*—W. R. Bell, Souris. Life membership was presented to Miss Christina MacLeod, former superintendent of Brandon General Hospital, retired.

The Prince Edward Island Medical Society

The Annual Meeting of the Prince Edward Island Division, Canadian Medical Society was held in Charlottetown on October 7, 1946. The day's program was divided into a morning business session, a luncheon, and an afternoon clinical session. Dr. Wallace Wilson of Vancouver, President of the Canadian Medical Society and Dr. A. D. Kelly, Assistant Secretary, were present and spoke at the luncheon. Dr. Leonard Farmer, retiring president, gave the presidential address, and introduced the official guests.

The clinical portion of the programme was made up of addresses by Dr. A. L. Wilkie of Montreal and Dr. Howard McCart of Toronto. Dr. Wilkie spoke on "Surgery of the gall bladder" and Dr. McCart on "Common ear, nose and throat problems in general practice". Both these addresses were exceptionally well handled and of the most practical help to the members who heard them, and the meeting expressed their appreciation to Dr. Wilkie and Dr. McCart for their addresses and to the Canadian Medical Society for arranging their visit.

At the morning business session the officers for the next year were elected as follows: *President*—Dr. Alex Murchison, Charlottetown; *Vice-presidents* (for Kings County)—Dr. George Inman, Montague; (for Queens County)—Dr. Eric Found, Charlottetown; (for Prince County)—Dr. Roy Grant, Summerside; *Secretary*—Dr. Gordon Lea, Charlottetown; *Treasurer*—Dr. I. J. Yeo, Charlottetown; *Executive Committee*—Dr. W. J. P. MacMillan, Dr. J. W. McKenzie, Dr. J. D. McGuigan, Dr. J. C. Simpson, and Dr. H. Moyse, of Summerside.

Regina and District Medical Society

Dr. Stephen Taylor, British Member of Parliament, was the guest speaker at the October meeting of the Regina and District Medical Society. Dr. Taylor was touring Canada under the auspices of the Canadian Minister of National Health. His subject was "The National Health Service Act of Great Britain".

At the November meeting held Saturday, November 23, 1946, at the Grey Nuns Hospital in Regina, we had the pleasure of hearing Dr. Tidmarsh of Montreal who spoke on the "Functional disorders of the gastrointestinal system".

Dr. Tidmarsh was in this city representing the University at a McGill reunion week end.

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec 8 novembre 1946.

RUPTURE DE LA RATE.—F. Trempe.

Il existe deux variétés de rupture de la rate: la *rupture spontanée*, qui survient presque toujours dans une rate malade et la *rupture post-traumatique*, qui se fait par choc direct ou indirect. Le mécanisme du choc indirect prend de l'importance à cause de la friabilité particulière de la rate même normale. En clinique, on distingue la *forme foudroyante*, avec mort en quelques heures et la forme où existe une période de latence plus ou moins longue pouvant aller de 24 heures à plusieurs semaines; c'est la *forme de rupture à retardement* et celle qui intéresse le chirurgien. Le traitement de la rupture de la rate est unique, c'est la splénectomie.

Observation: Un ouvrier de 44 ans tombe directement sur les pieds d'une hauteur de quinze pieds.

Après une période de choc primitif, dont il est en train de sortir, il présente, 45 heures après son accident, des symptômes d'hémorragie interne avec douleur intolérable et large plastron de l'hypocondre et du flanc gauches. A ce moment, opération d'urgence: on trouve une rate flottant au milieu d'énormes caillots, presque déchirée en trois morceaux et détachée de son pédicule; la rate est donc enlevée, comme s'il

s'agissait d'un caillot. Hémostase par ligature des vaisseaux spléniques le long du bord supérieur du pancréas. Gros shock post-opératoire normales.

DEUX CAS DE RUPTURE DE LA VESSIE.—J.-M. Lemieux et N. Lavergne.

Ces auteurs rapportent deux cas de rupture de vessie. Ils groupent les symptômes de la façon suivante dans les cas où le traumatisme est ignoré à cause d'un état d'ivresse.

1. Une douleur abdominale intense dans le bas ventre avec réaction péritonéale de type non inflammatoire, mais de type chimique comme celle que nous rencontrons dans les perforations d'ulcères, c'est-à-dire avec absence de température rectale, et leucocytose modérée, (l'un de nos malades avait 17,500 et l'autre 2,750).

2. Des signes urinaires portant notre attention vers cet appareil, ces signes sont de la dysurie, du ténesme, des mictions petites et sanguinolentes ou même parfois une absence de miction remontant à plusieurs heures. Ces signes urinaires amènent le médecin à faire un cathétérisme et il retire alors une quantité plus ou moins abondante d'urines sanglantes. Cette quantité peut être parfois considérable, mais comme le dit Marion, cela ne prouve pas l'intégrité de la vessie, car ce n'est plus un sondage vésicale que l'on fait, mais un sondage abdominal.

3. Une maladie dont on ne peut retracer l'origine à cause d'un état d'ivresse, ce qui ne prouve pas le traumatisme mais peut le laisser supposer.

CONSIDERATIONS SUR TROIS CAS D'AGRANULOCYTOSE.—R. Lemieux et J. Hallé.

Les auteurs présentent trois observations qui illustrent le rôle de l'étiologie médicamenteuse de l'agranulocytose. Dans les deux premiers cas, il s'agissait d'amidopyrine, dans le dernier cas, de sulfamidés. Ils mettent en lumière la fréquence de plus en plus grande de l'agranulocytose, la nécessité pour le médecin et le laryngologiste de penser à cette entité morbide en face d'ulcérations nécrotiques de la bouche et l'efficacité étonnante de la pyridoxine dans le traitement de ces cas.

A PROPOS D'UN CAS DE DISSOCIATION AURICULO-VENTRICULAIRE INCOMPLÈTE.—Sylvio LeBlond et Guy Drouin.

Les auteurs présentent l'observation d'un homme, célibataire, âgé de 42, qui, depuis l'âge de sept ans, fait des crises surtout caractérisées par les lipothymies de courte durée; ces manifestations sont graduellement devenues plus graves, en étant plus fréquentes et plus longues. Le 17 février 1945, il fait une crise très sérieuse à l'occasion de laquelle il est inconscient pendant quatorze heures.

Depuis de début des troubles, le malade a été examiné à plusieurs reprises sous la direction de médecins différents, et plusieurs fois au cours de séjours à l'hôpital. Ces examens ont toujours été négatifs.

Au mois de mai 1945, au cours d'un séjour à l'hôpital du Saint-Sacrement, à l'occasion d'un malaise, un tracé électrocardiographique révèle un état passager de dissociation auriculo-ventriculaire incomplète.

Les auteurs discutent le diagnostic et émettent l'hypothèse que les manifestations subjectives sont sous la dépendance d'une étiologie double: de l'hyper-vagotonie associée à de la sclérose coronarienne.

La Société de Chirurgie de Montréal

La société de chirurgie de Montréal 2 octobre, 1946.

L'HYSTÉRECTOMIE TOTALE.—P. Meunier.

Le rapporteur nous parle de l'hystérectomie totale qui tend de plus en plus à remplacer l'hystérectomie subtotale. Grâce à l'amélioration des préparations opératoires, des techniques chirurgicales, de l'anesthésie et des soins post-opératoires, la mortalité et la

morbidity de cette intervention ont été réduites au même niveau que dans l'hystérectomie sub-totale.

L'hystérectomie totale prévient le développement du cancer dans le moignon cervical, élimine les cervicites et les leucorrhées persistantes, conserve in situ un ou les deux ovaires. Parmi les objections à l'hystérectomie totale, l'auteur signale la difficulté opératoire, le raccourcissement possible du vagin, la modification des sécrétions vaginales et le domaine sexuel.

L'auteur ne décrit pas la technique opératoire de l'hystérectomie totale connue des chirurgiens et fait ressortir quelques détails d'exécution. Quant au drainage, il n'y a pas de règle fixe mais le drain est nécessaire chez certains cas, comme par exemple les cas d'endométriose étendue, d'exsudat péritonéal, d'anémie ayant reçu des transfusions pré-opératoires.

ETUDE OSTÉOLOGIQUE DU PIED.—R. Larichellière.

Etude de 2,516 radiographies du pied en vue de trouver des applications cliniques à cette étude. Les conclusions ont été les suivantes: (1) le scaphoïde surnuméraire se rencontre dans 10% des cas; (2) la formule digitale normale est 1, 2, 3, 4, 5; (3) la formule métatarsienne normale est 1, 2, 3, 4, 5; (4) l'hypermobilité du premier segment métatarsien et le métatarsus varus primus s'accompagnent habituellement d'une hypertrophie du deuxième métatarsien; (5) l'hypertrophie du deuxième métatarsien se rencontre dans la majorité des cas; (6) le pied creux congénital peut être différencié du pied creux acquis par l'examen radiologique.

TUMEUR DU POU MON GAUCHE—FIBROXANTHEME. PNEUMONECTOMIE.—B. Ricard.

Il s'agit d'une fillette, de 12 ans, impubère a passé asthmatic au poil de chat, admis le 28 novembre 1945, à l'hôp. Notre-Dame du service de Pédiatrie du Dr Guibault pour toux et expectoration sanguinolente remontant à environ trois mois, et de douleurs précordiales vagues.

Une bronchoscopie par le Dr Latraverse laisse soupçonner l'envahissement de la bronche souche gauche. Mais les radiographies prises sous diverses incidences laissent croire qu'il s'agit d'une tumeur du médiastin postérieur développé vers le poumon gauche. Un pneumothorax thérapeutique contre les hémoptysies causées par la bronchoscopie nous aide à visualiser un lobe supérieur bien collabé cependant que le lobe inférieur est totalement adhérent. Les radioscopies et graphies de l'œsophage laissent entrevoir un organe repoussé en avant et à droite par la masse ce qui nous fait porter un diagnostic du tumeur du médiastin postérieur ayant envahi le poumon.

Le 16 janvier 1946, l'auteur pratique une pneumonectomie gauche avec dissection et ligatures séparées des éléments du hile. La tumeur est de la grosseur d'une orange occupe presque tout le lobe inférieur et envahit la bronche souche. L'histo-pathologiste, Dr Chs Simard, porte le diagnostic de fibroxanthème.

L'évolution est un peu mouvementée mais tout rentre dans l'ordre et la malade obtient son congé, le 31 janvier. En avril 1946 un épisode grippal semble vouloir compromettre une heureuse convalescence mais après une quinzaine de fièvre la malade redevient mieux et son état est actuellement normal.

Upper Vancouver Island Medical Association
Annual Meeting

The Annual Meeting of the Upper Island Medical Association was held at Parksville on Thursday, November 20, 1946. There was an excellent attendance from all parts of the District despite the inclement weather.

Following a very excellent dinner the meeting opened with Dr. G. B. Helem of Port Alberni in the Chair. Scientific papers were given by Dr. H. H. Pitts and Dr. J. C. Thomas of Vancouver. Dr. D. W. Johnstone of the Department of Veterans' Affairs and Dr. M. R. Caver-

hill, Executive Secretary of the British Columbia Medical Association also addressed the meeting.

Elections placed the following in office for 1946-47: *President*—Dr. H. A. Mooney, Courtenay; *Vice-president*—Dr. P. L. Straith, Courtenay; *Secretary-treasurer*—Dr. E. R. Hicks, Cumberland; *Representative to Board of Directors, B.C. Medical Association*—Dr. A. P. Miller, Port Alberni.

MISCELLANY

Association of Anaesthetists

On October 31 the Association of Anaesthetists of Great Britain and Ireland celebrated the centenary of anaesthesia by holding a dinner in the great hall of Lincoln's Inn. Sir Alfred Webb-Johnson, P.R.C.S., said that the achievements of British medicine in the past hundred years made up one of the brightest constellations in the history of this country. The early work on anaesthesia formed a sort of prologue to the development of antiseptics, x-rays, radium, bacteriology, vitamins, and hormones. Anaesthetists might well feel what Oliver Wendell Holmes called "a noble satisfaction" in steering their patients through some of the most critical situations in life. They were right to insist on their status, which was that of a practical practising physician, administering drugs of great potency, and assessing the fitness of patients to receive them. They were also practical common-sense people who had established their headquarters in Lincoln's Inn Fields. Dr. A. D. Marston, the president, said that anaesthetists had much to gain from other specialties and from combined operations against disease. But they also had their autonomous moments and were expanding their sphere, and he was glad to see that Birmingham had led the way by putting an anaesthetist in charge of resuscitation and the treatment of shock. Not so long ago the British Medical Association held that every general practitioner's knapsack held a bottle of chloroform which might be used at any time for any operation; but the B.M.A. now recognized the value of the specialist anaesthetist and had acceded to a request from 400 members to form an anaesthetists' group. Replying to Dr. John Gillies's toast of The Guests, Dr. Charles Hill, secretary of the B.M.A., feared lest the bottle of chloroform in the practitioner's knapsack might be replaced by a mass of printed forms to be completed in triplicate. Commenting on reports of a recent speech by Mr. Bevan to medical students, he concluded on a topical rejoinder by remarking that the Minister needed no guidance in using the chloroform which comforts, the ether which irritates, or the curare which induces muscular relaxation. Dr. Wesley Bourne, of Montreal, bringing greetings from Canada and the United States, pointed out that, in commemorating the early anaesthetists, we should properly go back to the philosophers of chemistry—Priestley, Davy, Lavoisier, Faraday—by whom man has ever since been kept on tiptoe. He quoted Paget's saying that the fault in specialization lies not in narrowness but in shallowness and a sense of self-sufficiency. Dr. Murchi, of Copenhagen, also responded as a guest. Finally, Dr. Z. Mennell said that, as every anaesthetist knows, what counts is the man behind the machine; and the president's health was drunk with musical honours.—From *The Lancet*, p. 702, November 9, 1946.

Certificates for Milk in Great Britain

The Ministry of Food's appeal to doctors to go easy in issuing certificates for priority milk cuts at the very tap-root of medical practice—the doctor-patient relationship. The doctor's first loyalty, we keep saying, is to his patient; and here we are being asked to consider the

interests of the community, as represented by the "normal consumer".

The doctor knows all about the troubles of normal consumers—he is usually one himself—but that does not make it any easier to refuse the plea of old Mrs. Muggins up the road, even though one suspects that most of the 14 pints a week that she gets for her duodenal ulcer goes into the plates of her three sons' wheat flakes.

As a fellow peripatetic remarked the other week, we doctors never asked to be the controllers of the nation's milk-supply, and we would be heartily glad to be rid of the whole time-consuming and thankless job. But nobody else is capable of taking it on, so we must make the best of it. What we are asked to do is to make a 44% cut in present certificates, and at least that would be saved for normal consumers if we could limit our certificates to people in the specified categories who are really going to drink the milk. The post-ulcer class is the one to keep an eye on, and I bet my boots that if they are cut down to the amount they actually drink we shall reach the 44% target with ease. We may have to instal a few chuckers-out in our surgeries, though. Will the Ministry of Food compensate us for loss of patients and for personal violence incurred in the exercise of our duty?—From "In England Now", *The Lancet*, p. 692, November 9, 1946.

Combating Rheumatism in Sweden

Prof. J. A. Höjer, chief medical officer of the Royal Swedish Health Department, recently described at a meeting of the Empire Rheumatism Council the campaign against rheumatic diseases in Sweden. The latest development was the building of a research institute in Stockholm which it was hoped would be opened early in 1948. The Swedish Research Council, analogous to the M.R.C. in Great Britain, has elected a sub-committee on research in rheumatic diseases. The various hospitals in Sweden devoted in whole or in part to rheumatic diseases worked to a central plan. Planning first began about 1934, when 656 beds were specially set aside for rheumatic patients; in 1941 a further 1,300 beds were provided, and in 1945 a further provision of 2,000 new beds was made. The basis of the latest plan was the reports of practitioners on all the rheumatic cases of which they had had knowledge in 1943. Nearly 1,400 doctors responded (80% of those expected to do so); the total number of cases reported was some 56,000. A calculation was made of the number of these requiring hospital care, the patients being divided into four categories: (1) acute arthritis; (2) chronic arthritis; (3) arthrosis; and (4) sciatica and miscellaneous rheumatic conditions. It was considered that a 60 days' stay in hospital should be allowed on the average for cases of acute arthritis, 90 days for chronic arthritis, and 40 days for the cases falling into the third and fourth groups.

It was proposed to relieve the hospitals by provision for convalescence and, especially in view of the increased longevity and the liability of old people to develop rheumatism, to increase the accommodation for chronic cases in the aged. A Swedish Association for Combating Rheumatism had been formed recently and worked in co-operation with the employers' and labour organizations, with the Swedish Medical Association, and with bodies of social workers.—From *Brit. M. J.*, p. 705, 1946.

CANADIAN MEDICAL WAR SERVICES

MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE OCTOBER 1946

(Previous sections in January, March, April, May, June, July, September, October, November and December, 1945 and January, March, May, June, July, August, September, October, November and December, 1946.)

SECTION LXXXVI

Name	Address	Date struck off strength	Name	Address	Date struck off strength
Anderson, J. R. F.	136 Genthron St., St. Boniface, Man.	26-8-46	Gagne, D. S. P.	411 St. Cyrille St., Quebec	22-8-46
Baragar, M. L.	738 McMillan Ave., Winnipeg	3-9-46	Galloway, G. D.	Alameda, Sask.	4-9-46
Barnes, G. W.	5 Chippawa Ave., Centre Island, Toronto	8-8-46	Gelinas, G.	60 Des Casernes St., Trois Rivières, Que.	27-8-46
Barrette, E.	St. Malachie, Dorchester City, Que.	12-8-46	Gigot, A. F.	Duparquet, Que.	19-9-46
Bashucky, W.	509 Cathedral Ave., Winnipeg	4-9-46	Gill, G.	17 Rue Roberval, Quebec	23-8-46
Beach, J. K.	Finch, Ont.	3-9-46	Glassman, L.	37 Wells Hill Ave., Toronto	13-9-46
Beattie, W. G.	66 Craig St., Ottawa	28-8-46	Gordon, A. S. P.	403 Huron Ave., Ottawa	5-9-46
Bell, B. O.	170 Waterloo Row, Fredericton, N.B.	29-8-46	Gorman, T. W.	34 Cornishtown Rd., Sydney, N.S.	9-8-46
Bell, D. M.	2104-8th St. W., Calgary	18-6-46	Gouin, J. R. E. M.	574 Notre Dame St., St. Lambert, Que.	12-9-46
Bell, T. A.	Taber, Alta.	31-8-46	Gould, T. P.	162 Rusholme Rd., Toronto	14-9-46
Best, E. W. R.	c/o 299 Queen St. W., Toronto	18-9-46	Grainger, F. A.	226 Highfield St., Moncton, N.B.	6-9-46
Black, C. R.	2310 College Ave., Regina	24-9-46	Grant, W. M.	407 Oxford St., Winnipeg	14-9-46
Boileau, G. R.	11407-100 Ave., Edmonton	17-9-46	Guild, J.	10632-103rd St., Edmonton	19-9-46
Boorman, G. C.	10932-87th Ave., Edmonton	23-8-46	Hartford, J. J.	1621 Salisbury Dr., Vancouver	26-9-46
Bourne, G. R.	112 Smith St., London, Ont.	12-8-46	Hartroft, W. S.	357 Hill St., London, Ont.	21-9-46
Bowen, R. J.	Lambeth, Ont.	26-8-46	Harvey, L. B.	21 Howland Ave., Worcester, Mass.	7-9-46
Boyd, B. A.	54 Pine Crest Rd., Toronto	26-9-46	Hatcher, G. H.	3574 University St., Montreal	18-9-46
Brisebois, R. C.	137 Notre Dame, L'Epiphanie, Que.	27-8-46	Heller, J. M.	48 Brunswick Ave., Toronto	5-9-46
Brockington, C. W. M.	125 Acacia Ave., Ottawa	23-9-46	Hertz, R. E. L.	55 McKay St., Ottawa	3-9-46
Brown, J. M.		30-8-46	Hill, M. G.	Hamilton General Hospital, Hamilton, Ont.	18-9-46
Brown, T. C.	38 Glengrove Ave. W., Toronto	10-9-46	Himel, H. A.	Toronto	5-9-46
Bryans, A. M.	22 Crescent Rd., Toronto	15-8-46	Hitsman, J. S.	8 Kensington Ave., Kingston, Ont.	29-8-46
Buckwold, A. E.	820 University Drive, Saskatoon	28-8-46	Horse, W. J.	43 Halford Ave., Toronto	23-9-46
Burgess, G. H.	Mount Albert, Ont.	23-8-46	Howell, E. B.	Pictou, N.S.	16-5-46
Callbeck, G. R. M.	893 Cardero St., Vancouver	13-9-46	Hudec, A. V. J.	Fox Valley, Sask.	18-9-46
Campbell, G. M.	11035-87th Ave., Edmonton	27-8-46	Kambourian, G. S.	1211 Drummond St., Montreal	20-8-46
Carignan, A.	Victoriaville, Que.	4-9-46	Kober, D. S.	(nee Adams) R.R. 1, Whitby, Ont.	14-9-46
Cawthorpe, H. A.	Montreal General Hospital, Montreal	9-9-46	Kobernick, D. R.	1775 Ducharme Ave., Outremont, Que.	13-9-46
Charlton, W. J.	1475 Nanton Ave., Vancouver	15-8-46	Kunstler, W. E.	5238 Queen Mary Rd., Montreal	9-9-46
Clow, L. R.	215 Lower William St., Kingston, Ont.	9-9-46	Lamoureux, L.	12000 L'Archivêque, Montreal	21-9-46
Coddington, R. D.	Ocean Falls, B.C.	9-9-46	Lewis, G. H.	Lanark, Ont.	4-9-46
Corbet, R. C. B.	10437 Saskatchewan Drive, Edmonton	27-8-46	Lightfoot, A. S.	267 Woodfield Rd., Toronto	6-9-46
Cormier, W.	18 Douville St., Quebec City	19-8-46	Locke, H. A.	Box 283, Liverpool, N.S.	31-8-46
Cornett, J. W. D.	52 Simcoe St. S., Oshawa, Ont.	10-9-46	Locke, J. C.	121 Aberdeen Ave., Westmount, Que.	17-9-46
Crassweller, P. O.	2014 Willistead Cres., Windsor, Ont.	24-8-46	Longo, A. J.	1696 Danforth Ave., Toronto	30-8-46
Creighton, A. M.	Tatamagouche, Col. Co., N.S.	26-8-46	Loudon, J. R.	210 Woolwich St., Guelph, Ont.	23-8-46
Dandenault, J. Y.	Coaticook, Stanstead Co., Que.	4-9-46	McDonald, J. A.	6550 Union St., Lochdale, Vancouver	28-9-46
Dewan, J. G.	15 Poplar Plains Cres., Toronto	5-9-46	MacDonald, J. A.	New Waterford, N.S.	13-8-46
Dickout, J. M.	11028-84th Ave., Edmonton	16-9-46	MacDonald, R. K.	80 Woodlawn Ave. E., Toronto	11-9-46
Dickson, R. K.	216 Maria St., Sarnia, Ont.	27-9-46	MacDonald, W. K.	20 Mountain St., Granby, Que.	19-8-46
Dunbar, J. S.	72 Maple Ave., Barrie, Ont.	25-7-46	Mackenzie, J. M.	3183 West 5th Ave., Vancouver	5-9-46
Duncan, H. A. G.	Royal Victoria Hospital, Montreal	30-8-46	McLellan, T. A.	59 McCamus Ave., Kirkland Lake, Ont.	26-9-46
Earn, A. A.	Elnora, Alta.	6-9-46	Martel, L.	St. Jean & Evangelists, Bonaventure, Que.	27-8-46
Easser, B. R.	349 Palmerston Ave., Toronto	21-8-46	Martin, M. G.	147 Victoria Ave. S., Hamilton, Ont.	3-9-46
Engel, J. P.	836 Mountain Ave., Winnipeg	10-9-46	Medd, D.	668 Alverstone St., Winnipeg	4-9-46
Engel, M. I.	1118 Giles Blvd. E., Windsor, Ont.	30-8-46	Melcalfe, J. O.	6 Strathcona Court, Lethbridge, Alta.	5-9-46
Ennis, J. M.	48 Tyrrel Ave., Toronto	10-9-46			
Farquharson, R. A.	Box 142, Meaford, Ont.	23-9-46			
Flahiff, E. W.	98 Pricefield Rd., Toronto	24-8-46			
Found, M. P.	1 Spruce Hill Road, Toronto	30-5-46			
Frain, J. B.	93 Braemar Ave., Toronto	6-9-46			
French, W. E.	Box 461, Vernon, B.C.	17-9-46			
Gaby, J. R.	46 Glenayr Rd., Toronto				

Name	Address	Date struck off strength	Name	Address	Date struck off strength
Miller, B. F.,	New Waterford, N.S.	24-8-46	Souter, A. W.,	301 Barrington St., Halifax	31-8-46
Milroy, T. W.,	Indian Head, Sask.	29-8-46	Spiro, H. M.,	117 Maple Ave., New Glasgow, N.S.	14-9-46
Montgomery, D. C.,	68 Glen Ave., Ottawa	24-9-46	Steen, O. T.,	72 King George's Rd., Toronto	11-9-46
Montour, J.,	7373 St. Denis St., Montreal	16-9-46	Stevenson, L. G.,	40 Fairbanks St., Oshawa, Ont.	17-9-46
Mosbaugh, M. M.,	21 Madison Ave., Toronto	26-8-46	Stewart, L. N.,	Radville, Sask.	31-8-46
Moyle, A. H.,	Hawkesbury, Ont.	26-8-46	Stuart, E. A.,	5175 Sherbrooke St. W., Montreal	19-8-46
Munroe, D. H.,	2125 Barker St., Niagara, Ont.	28-9-46	Swallow, K. A.,	10504-127th St., Edmonton	17-9-46
Otto, T. C.,	Warner, Alta.	25-9-46	Thomas, J. R.,	773 Broadway Ave., Winnipeg	13-9-46
Parsons, W. B.,	Red Deer, Alta.	30-8-46	Titecombe, E. P.,	371 Broadview Ave., Toronto	30-5-46
Patterson, R. J.,	Prescott, Ont.	26-9-46	Tufford, W. H.,	Box 55, Beamsville, Ont.	9-9-46
Paul, E. B.,	R.R. 2, Odessa, Ont.	26-8-46	Turcot, E. A.,	Montreal General Hospital, Montreal	19-9-46
Procunier, C. W.,	322 Beech St., Toronto	10-9-46	Turmel, J. T.,	Beaupre, Montmorency Co., Que.	31-8-46
Randall, H. S.,	Bristol, N.B.	13-8-46	Tysoe, F. W.,	R.M.D. 4, Victoria	24-9-46
Redmond, L.,	1469 Drummond St., Apt. 48, Montreal	27-9-46	Weaver, S. A.,	Castor, Alta.	29-8-46
Reid, J. A. G.,	5 Schofield St., Toronto	3-9-46	Weslake, A. A.,	Beausepier, Man.	13-9-46
Rinfret, G. G. F.,	4840 Westmount Ave., Montreal	10-9-46	West, W. G.,	485 Dundas St., Woodstock, Ont.	9-9-46
Robb, W. A.,	Qu'Appelle, Sask.	6-9-46	Westgate, F. G.,	1632 Hollywood Cres., Victoria	6-9-46
Robinson, G. C.,	1475 Tolmie St., Vancouver	31-8-46	White, W. J.,	257 Larch St., Sudbury, Ont.	3-9-46
Roby, H. R.,	28 Arlington Place, Truro, N.S.	16-9-46	Wilford, A. (nee Tate),	Kenora, Ont.	23-9-46
Roe, B. V.,	347 Salter St., Winnipeg	20-8-46	Wilford, E. J.,	Kenora, Ont.	23-9-46
Rosen, H. J.,	3983 St. Urbain St., Montreal	27-8-46	Willis, J. S.,	63 Wells Hill Ave., Toronto	28-8-46
Saint Martin, M.,	Hospital Ste. Justine, Montreal	1-3-46	Williston, D. H.,	42 Cheritan Ave., Toronto	17-9-46
Samson, G. A.,	41 Porier St., Charny, Que.	3-9-46	Wilson, D. L.,	20 Fairholt Rd. S., Hamilton, Ont.	4-9-46
Sanders, C. B.,	31 Chalmers Ave., London, Ont.	29-8-46	Winsor, H. C.,	1094 Randolph Ave., St. Paul, Minn., U.S.A.	20-9-46
Senecal, J. M. P.,	5346 Brodeur Ave., Montreal	12-9-46	Woodrow, W. A.,	Lindsay, Ont.	30-8-46
Shaw, G. B.,	Bridgewater, N.S.	17-9-46	Younger, L. I.,	11004-86th Ave., Edmonton	31-8-46
Shugar, J. L.,	5119 Esplanade Ave., Montreal	6-9-46	Younghusband, O. Z.,	20 O'Keill St., Kingston, Ont.	16-9-46
Siegel, E. J.,	99 Chedoke Ave., Hamilton, Ont.	21-9-46	Zack, J. J.,	528-1st St., New Westminster, B.C.	27-8-46
Sigal, B.,	694 McDermot Ave., Winnipeg	18-9-46			
Smit, J. S.,	Vankleek Hill, Ont.	3-9-46			
Smith, G. L.,	Windermere, B.C.	22-8-46			
Solway, S. A.,	234 Primrose Ave., Ottawa	30-8-46			

CORRESPONDENCE

Canadian Aid to China

To the Editor:

During an eight-year residence in Chungking—Free China's war-time capital—I was able to observe personally the partial destruction of her hospital facilities and the gradual and progressive deterioration of the medical fraternity's ability to practise medicine and surgery of the highest quality due to an increasing lack of supplies and equipment which persisted until the end of the war. This deterioration was accompanied by a determination on the part of the medical schools and hospitals, both foreign and governmentally-sponsored, and the National Health Administration, to maintain the highest possible standards under existing circumstances and shortages.

Two years' responsibility for the administration and distribution of assistance from Canada to the medical and general relief needs of China put me in closely conversant touch with her medical needs. Subsequently from March to July, 1946, I was delegated to make a further survey of similar needs in previously-occupied Chinese territories. This investigation took me into both Nationalist and Border-Region areas where I found the medical conditions and needs to be essentially similar.

In both areas the very limited local medical resources of the country were mobilized in an endeavour to meet the needs of a people who, during the period of the war, had refused the medical assistance which they might have received from the Japanese. In many places the needs of these people were desperate. In one locality, kalazar, which was endemic, had developed into huge proportions. Few medical supplies were available to control this easily-curable disease. Thousands were dying of it. In another, people were still suffering from the gastro-intestinal residual effects of the diet of grass,

roots, bark of trees and any other available edible and many nonedible materials on which they had subsisted during three years of famine.

The conditions of hospitals and medical schools, briefly, could be placed in three broad categories: (a) those wholly or partially destroyed by bombing, 20 to 25%; (b) those from which the contents were largely or completely looted, 20 to 25%; (c) those which had suffered no gross damage or losses, 50%. In this third category (c), however, medical supplies were inadequate; surgical and dressing instruments were worn to the point where at least 50% might be considered as entirely useless. There were few hospitals with adequate autoclaving facilities. Many of them had none and were steaming their instruments and operating room equipment for from three to five hours in non-pressure, Chinese-style steamers. Equipment in general, including bedding, had reached the point where it was, to quote Dr. Wilder Penfield's words: "in an almost comic state of deterioration"; that is, where such was available at all. In other words, the actual physical needs of 100% of China's hospitals, irrespective of sponsorship, varied only in degree from a minimum of perhaps 35% to complete rehabilitation.

Seventy-five per cent of the hospital beds, 80% of nursing schools, 50% of the medical schools in China have been, and still remain, the responsibility of foreign groups. The losses sustained and the needs to be met by them are far in excess of their single abilities to sustain. Throughout the war many of the urgent maintenance needs were met by voluntary relief grants from Canadian relief and Church agencies. In an endeavour to fully rehabilitate these institutions, Canadian Aid to China will conduct a nation-wide campaign to permit the maintenance of assistance in meeting, together with British and American relief agencies, general and medical relief in China. The Canadian Red Cross Society and the several Churches, both Protestant and Roman Catholic, are also providing considerable as-

sistance for similar projects. All funds raised will be handled through a responsible Canadian committee in China whose honorary chairman is the Canadian Ambassador.

This is a specific need in which Canadian medical men and interests can give great assistance, not only in the provision of cash assistance for general or selected supplies and equipment, but in the donation of usable equipment and instruments and medical books in English for hospitals and nursing schools which have been edited not later than eight or at most ten years ago. No medical literature has reached China since 1941 and in some areas since 1938.

May I request that you please give this urgent appeal your immediate attention. The need is almost unlimited.

A. STEWART ALLEN, M.D.

371 Bay Street, Toronto, 1.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

THE HEALTH BILL AND THE PLEBISCITE

The National Health Service Bill is at last on the Statute Book. In the closing stages the House of Commons accepted an amendment introduced in the House of Lords, that endowments to hospitals made before the Act came into operation should be devoted to the purpose for which they were intended by the donor and not placed in the common pool. Another Lords' amendment, however, proposing that doctors participating in the new service should be paid exclusively by capitation fees, and not by capitation fees plus a basic salary, was rejected by the Commons.

No one is entirely pleased with the Act, but it is generally agreed that it is as effective a compromise as could have been expected in view of the political complexion of the present Government. As has been frequently pointed out, it is primarily an enabling Act and the efficiency of the service to be created depends very largely upon the spirit in which the Minister of Health interprets the regulations.

Many doubt whether it will be possible to bring the Act into force by the spring of 1948, and there is much approval of the suggestion put forward by Sir Harry Bashford, formerly medical adviser to the Treasury, that the Act should be introduced in two stages. His suggestion is that the hospital half of the Act should be proceeded with first and that the general practice half should not be introduced until the hospital scheme is working satisfactorily. Admirable compromise though this may be, there is, regrettably, little hope of its being accepted by the Minister.

Attention is now focused upon the plebiscite which the British Medical Association is holding to ascertain the views of the profession as to whether the Negotiating Committee of the Association should enter into negotiations with the Minister on the regulations authorized by the Act. The Association has made it abundantly clear what it considers the answer should be. The wisdom of such action at this stage has been questioned, and there is a widely held feeling that the time has not yet come for the profession to decide whether they are prepared to enter into the scheme. The time for such decision, it is suggested, will be when the full details of the new service have been worked out.

THE CLOSED SHOP

Mr. Bewan must be praying these days to be saved from his friends. First of all his colleague at the Ministry of Food issues a public statement in which, in the words of the council of the British Medical Association, "the medical profession is blamed for lax or improper certification in respect of the supply of milk

to invalids." And now a London borough council has issued notices of dismissal to the matron, deputy matron and 36 sisters and nurses of one of their hospitals and the entire midwifery staff of their maternity hospital as well as the domiciliary midwives of the borough because of their refusal to join a trade union. At least one of their medical officers has received a similar notice.

This is part and parcel of a policy which is being adopted by many local authorities that, as in the case of industry, all their employees must belong to a trade union affiliated to the Trade Unions Congress. In the case of nurses and doctors the important point is that neither the College of Nursing nor the British Medical Association is recognized as a trade union because neither is affiliated to the Trade Unions Congress. As the T.U.C. is affiliated to the Labour Party and provides a considerable proportion of the income of the Party, the possible implications of this latest development are not difficult to foresee, and there can be little doubt that they will be strongly resisted by the vast majority of the profession. From the Government's point of view no more unpropitious moment could have been chosen for the raising of this particular problem.

A CHILD HEALTH SERVICE

The latest of the masterly series of reports emanating from the Royal College of Physicians contain important proposals for a child health service for the nation. Of recent years there has been increasing dissatisfaction with the present arrangement whereby the preventive services in the hands of local authorities are independent of the curative services carried out by the hospitals. The Report proposes that these two aspects of child health work should be closely integrated so that child health officers should have opportunities for clinical experience in hospitals, while paediatricians should play a more important rôle in the work of municipal clinics.

The other important desideratum laid down is that the general practitioner should be primarily responsible for the medical care of the child, in both the prevention and treatment of disease. This will entail considerable change in the medical curriculum, both undergraduate and postgraduate, to ensure that the general practitioner enters upon his professional career with a sound knowledge of the elements of paediatrics and is subsequently able to obtain regular instruction in the subject. There is already ample evidence that the urgency and importance of the subject are appreciated. Chairs of Child Health are being set up in practically every university in the country, and within a few months there will be only one or two universities that do not possess such a department. Indeed the immediate problem lies in finding suitable candidates for the Chairs.

THE LONDON MEDICAL EXHIBITION

The first post-war London Medical Exhibition last month provided a striking commentary upon the tremendous advances in the control of disease that have taken place during the 1939-45 war. Streptomycin, "white penicillin", mepacrine, paludrine, and plastics were all on show. The sulfonamides were there too, but overshadowed by the antibiotics. What had been the centre of therapeutic interest in 1938 was now gradually giving way to discoveries or advances that had only been possible as a result of the demands of totalitarian warfare. Fashions in therapeutics are notoriously unpredictable, but there was every sign at the Exhibition that the main trends of therapeutic developments were well established. Old fashioned galenical favourites were still to be seen, but they have taken second place to the newer discoveries of the laboratories. What had been "front page news" a few years ago was now taken as a matter of course, and the demand was for something better. More than one visitor to the Exhibition consoled himself with the thought that, even though science might destroy us with atomic bombs, while we survived there still was hope, and that the knowledge accumulated for the purposes of totalitarian destruction.

could still hold out high hopes for suffering humanity; perhaps as consoling a thought as any with which to enter upon the New Year. WILLIAM A. R. THOMSON
London, December, 1946.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Some Effects of the Rice Diet Treatment of Kidney Disease and Hypertension. Kempner, W.: *Bull. N.Y. Acad. Med.*, 22: 358, 1946.

Experiments in cellular physiology of the kidney are described. The metabolism of kidney cells was studied by making changes in the chemical environment. Anaerobic splitting of sugar into lactic acid was dependent on changes of the sodium bicarbonate, sugar and hydrogen ion concentration. The rate of oxidation was largely independent of sodium bicarbonate, sugar and pH, but was dependent on variations of oxygen concentration. Lowered oxygen concentrations inhibited the deamination of amino-acids and the formation of ammonia, this inhibition of the rate of deamination is reversible; another effect of low oxygen concentration is irreversible, that is, the inability to oxidize ketoacids.

These cellular physiological findings have a practical significance. If the oxygen supply to any one kidney cell has been decreased by some pathological condition and we cannot increase it, then it might be possible to increase oxygen concentration by reducing the amount of work required from this cell, thus decreasing the oxygen demand.

From these experiments followed the treatment of renal metabolic dysfunction by the rice diet. Before these cases were reported the consensus was that dietary treatment is useful in kidney disease, but of little or no value in hypertension without obvious renal involvement. Compared to diets previously used in hypertension, the rice-fruit-sugar diet is rigid. It contains 5 gm. of fat, 20 gm. of protein, derived from rice and fruit, not more than 0.2 gm. of chloride and 0.15 gm. of sodium; the 2,000 calories is made up of rice and fruit. Arguments used against this diet are that it is nothing but starvation, and that 45 gm. of protein is needed to maintain protein equilibrium. The average daily urea nitrogen excretion in the urine of the patients who have followed the rice diet for 2 months or more is 1.1 gm.

It has been argued that fat restriction is too rigid. But the relationship between hypercholesteræmia and hypertensive vascular disease has been observed in regard to vascular retinopathy, coronary disease and arteriosclerosis. In a series of 79 patients with hypertensive vascular disease, 53 had a cholesterol concentration of at least 220 mgm. per 100 c.c. serum at the beginning of treatment. The hypercholesteræmia decreased with the rice diet in 52 patients; the average decrease was 74 mgm. per 100 c.c. serum.

The rice diet led to objective improvement in 203 of 322 patients, on most of whom other forms of therapy had been tried. Of 100 patients with primary kidney disease, 65% showed improvement. Of 222 patients with a diagnosis of hypertensive vascular disease 62% improved. The author believes that rice diet should be tried before sympathectomy.

In 77 of 87 patients with hypertensive vascular disease the heart became smaller. In 10 of the 87 the heart became larger. Forty-four patients with hypertensive vascular disease had papilloedema, hæmorrhages or exudates; they followed the rice diet two months or longer. In all of them the retinopathy was arrested; in 20 of the 44 these conditions cleared up partially and in 20 completely.

LILLIAN A. CHASE

Nitrogen Mustard Therapy. Jacobson, L. O. *et al.*: *J. Am. M. Ass.*, 132: 263, 1946.

Since March, 1943, a series of 59 patients with neoplastic and allied disease of the hæmopoietic system have been treated with methyl-bis (β chloroethyl) amine hydrochloride. The diagnosis of each patient was confirmed by biopsy or sternal puncture. The diseases treated with this drug include: Hodgkin's disease; lymphosarcoma; sympathoblastoma; multiple myeloma; myelogenous leukæmia, acute and chronic forms; polycythæmia rubra, and lymphatic leukæmic acute and chronic forms. The dosage of the drug was 0.1 mgm. per kilogram of body weight given in courses of one to seven daily injections.

The usual immediate toxic reaction or nausea and vomiting manifests itself within three to four hours after administration. A delayed but more serious toxic manifestation is the lymphopenia, neutropenia, and thrombocytopenia which almost invariably occurs within the first three weeks. The rapidity and severity with which these latter reactions become manifest depends on the sensitivity of the patient to the drug, on the disease concerned, and on the total amount of the drug given in a course. With courses of four or more injections, leukopenias of 2,000 cells per c.mm. are common. Anæmia may develop but is usually minor. The hæmatologic changes observed in the peripheral blood are paralleled in the bone marrow. Serial sternal puncture material and rib biopsies on selected patients indicate that an extreme degree of destruction may occur. Recovery of the bone marrow, however, as indicated by aspiration and biopsy studies, is complete after varying intervals. The constituents of the peripheral blood otherwise returns to normal values.

Patients have been observed after single or repeated courses of methyl-bis (β -chloroethyl) amine hydrochloride from two to thirty-three months. The clinical remissions vary from zero to eighteen months. Certain disease processes such as acute leukæmia and multiple myeloma failed to respond to treatment. The clinical results in most cases of myelogenous leukæmia and in a few cases of lymphatic leukæmia, lymphosarcoma, and Hodgkin's disease were not satisfactory. Encouraging results have largely been confined to Hodgkin's disease. The common symptoms of fever and malaise are frequently relieved within a short period after the initiation of treatment. Lymphadenopathy, splenomegaly, and hepatomegaly usually regress rapidly. Repeated courses of treatment with the drug have produced further remissions. In certain cases of Hodgkin's disease classified as roentgen ray resistant, significant clinical remissions have been produced.

S. R. TOWNSEND

Radiophosphorus as the Treatment of Choice in Primary Polycythæmia. Erf, L. A.: *Am. J. Med.*, 1: 362, 1946.

Polycythæmia may be primary, secondary, or familial. The secondary type is consequent upon the attempts of the organism to compensate for anoxæmia due to cardiopulmonary disease or high altitudes: the familial type is a rare congenital disease in which there is a normal hæmoglobin level but an increased number of erythrocytes, and in which the life expectancy of the patient is unaltered. The primary type, however, is characterized by a hypertrophy of the bone marrow in all its elements. There is an increased blood volume as well as raised red cell, white cell and platelet counts. Splenomegaly, elevated basal metabolic rate, and raised blood uric acid levels are also found. The duration of the disease if untreated is probably 10 to 15 years. Regardless of what type of treatment is given, about 10% of cases eventually develop leukæmia.

The author reviews more than 200 cases of primary polycythæmia who have received treatment with radioactive phosphorus. Ninety per cent of these had satisfactory remissions. The author's own series of 30 cases showed 41 remissions (three patients had 3 remissions each) which lasted from six months to four years. Some of the remissions are still in progress. Five

deaths occurred in the series, none of which could be attributed to radiophosphorus: one patient died of myeloid leukaemia, one following a gastric haemorrhage, two of pneumonia and one of tuberculous peritonitis.

In the author's experience a low iron diet is desirable to prolong the remission. Six patients were given thiouracil with the hope that its effect on the bone marrow would prolong the remission: in these the remission has lasted for more than one year but a longer period must elapse before final evaluation.

The author concludes that primary polycythaemia is probably related to chronic myeloid leukaemia: that the normoblasts in this condition are specially sensitive to radiation: and that in the present state of knowledge radioactive phosphorus is the most promising and efficient mode of treatment.

DOUGLAS FINDLAY

Radiation Effects on the Human Stomach. Brick, I. B.: *Rev. Gastroenterology*, 13: No. 5, 1946.

Previous experimental work on dogs and rabbits has shown that the gastric mucosa is sensitive to x-radiation; Engelstadt, using doses of 1,500 roentgens, was able regularly to produce ulceration in the rabbit's stomach, while Hueper and DeCarvopal-Forero working with dogs produced perforating gastric ulcers by using doses up to 6,000 roentgens in four weeks. However, the effects of x-radiation on the normal human stomach have not previously been adequately described.

The present author, working at the Walter Reed General Hospital, has had the rare opportunity of observing the effects of massive doses of high voltage radiation on the normal human stomach in patients submitted to deep x-ray therapy for neoplastic conditions apart from the gastro-intestinal tract. One patient received 28 treatments totalling 5,600 roentgens for metastases to aortic lymph-glands from a pathologically proved adenocarcinoma of the right kidney. Three weeks later he developed the symptoms of peptic ulcer, and barium meal examination showed two gastric ulcers whose presence was confirmed by gastroscopy. A second case, that of a 29-year old soldier with a histologically proved malignant teratoma of the left testicle, was given 12,300 roentgens in 33 days for metastases to paravertebral lymph nodes. Three weeks later a large prepyloric ulcer was shown by x-ray examination. Despite a strict ulcer regimen, this patient had repeated attacks of hæmatemesis, and gastric resection was considered advisable. Operation revealed a perforated peptic ulcer: following gastric resection, the patient's subsequent course was uneventful.

A third patient, suffering from malignant testicular tumour with metastases, was given 5,000 roentgens directed at retroperitoneal glands. Four months later this patient developed severe and intractable hæmatemesis and a subtotal gastrectomy was performed. Pathological examination showed diffuse submucosal hæmorrhagic areas with thickening and oedema. These clinical observations indicate that the normal human stomach is sensitive to high voltage radiation and that effects similar to those observed experimentally in dogs and rabbits are produced by therapeutic doses of x-radiation.

DOUGLAS FINDLAY

The Use of Tetraethylammonium in Peripheral Vascular Disease and Causalgic States. Berry, R. L., Campbell, K. N., Lyons, R. H., Moe, G. K., and Sutler, M. R.: *Surgery*, 20: 525, 1946.

The part played by vasoconstriction in peripheral vascular disease has been evaluated in the past by means of local nerve block, spinal anaesthesia and paravertebral sympathetic block. Recently a new method of producing a spinal blockade of autonomic ganglia by means of parenteral injection of the tetraethylammonium ion has been introduced. The drug is used to improve circulation and to relieve pain. After suitable control studies have been made, tetraethylammonium (bromide or chloride) was injected intravenously or intramuscularly in a 10% solution and further observations made. The intravenous dose ranged from 100 mgm. (1 c.c.)

to a maximum of 500 mgm. injected slowly over 15 to 60 seconds using significant changes in the volume of the pulse and general reaction of the patient as a guide to cease or delay further administration of the drug. Intramuscular injection was used to produce a prolonged effect. When compared to other methods, the results were very favourable. The ease of administration should make this a useful diagnostic procedure.

The authors used it satisfactorily in functional vascular disorders such as Raynaud's disease, in organic obstructive vascular lesions, causalgic disorders, reflex sympathetic dystrophies and thrombophlebitis. It was found that it could be used as an out-patient procedure. The drug has been administered more than a thousand times in more than five hundred patients in the doses indicated with very few alarming reactions.

PRESTON ROBB

Morphological Examination of the Blood and Sternal Marrow of Nine Patients Treated with Thiouracil. Gessler, C. J.: *J. Haematology*, 1: No. 5, 1946.

Complete blood and bone marrow studies were done on nine patients before and after receiving thiouracil for hyperthyroidism. Four of the nine patients had white blood counts of less than 4,000 before treatment was instituted; under treatment two of these developed more severe leukopenia with white counts falling to 2,500. Study of blood smears and bone marrow slides of these two cases showed some evidence of a toxic reaction in that there was an increased number of premyelocytes and immature myelocytes with abnormally large myelocytes. The author feels that weekly examination of a blood smear should be carried out on patients receiving thiouracil, as well as repeated blood counts: in this way early toxic changes in the granulocytes will be detected.

DOUGLAS FINDLAY

Surgery

Observations on Radical Surgery for Lesions of the Pancreas. Whipple, A. O.: *Surg., Gyn. & Obst.*, 82: 623, 1946.

A review of the history of the progress made in removing malignant tumours of the ampullar area and pancreas shows steady progress, especially during the past ten years, in this difficult field. The author relates this progress to the appreciation of silk technique, vitamin K, blood transfusions and other shock prevention therapy. The rapid digestion of catgut seemed the chief cause of the serious complications: postoperative hæmorrhage, duodenal fistula, and peritonitis.

A one-stage procedure is advocated. Hæmorrhage and postoperative oozing is controlled by vitamin K in the form of hiquinone for forty-eight hours preoperatively. A second operation in the same field is complicated by massive vascular adhesions resulting from the first. Cholecystgastrostomy is avoided because the danger of ascending infection is greater than when the common duct is anastomosed to jejunum, and a ligated common duct is prone to leak. The duodenum should be removed because its blood supply is jeopardized by removal of the head of the pancreas and lymph glands are more certainly removed. The pancreatic duct is implanted into the jejunum using a small rubber tube. The individual variations in the anatomy of the head of the pancreas must be thoroughly explored so that the superior mesenteric vessels are not damaged. Continuous suction drainage of the denuded retro-duodenal area is advised. Penicillin is given preoperatively and a Levine tube is left in the stomach for postoperative suction.

BURNS PLEWES

Injuries to the Pancreas and their Surgical Treatment. Aldis, A. S.: *Brit. Surg.*, 33: 323, 1946.

The pancreas may be crushed against the first lumbar vertebra by a sudden blow when the abdominal wall is not tensed. Occasionally it is the only viscus injured. Left shoulder tip pain is an important sign when there are effusions into the lesser sac. Some patients apparently recover without immediate laparotomy but

return later with attacks of pain, vomiting and distension due to a pancreatic cyst or pseudo-cyst. This latter is rare: 1:40,000 surgical patients.

The traumatic cyst appears most often six weeks after injury. It increases in size by repeated hæmorrhages ten to fourteen days apart and most often appears between the stomach and the colon, causing deformity of the stomach in gastric x-rays. Removal is technically impracticable and marsupialization is the standard practice. Anastomosis of the cyst to the jejunum is suggested.

Careful studies on the physiology of pancreatic fluid from a patient with a persistent fistula are recorded.

BURNS PLEWES

The Technique of the Syme Amputation. Aldredge R. H. and Thompson, T. C.: *J. Bone & Joint. Surg.*, 28: 415, 1946.

The 100-year old Syme amputation has been used extensively in the United States only during and since World War II. Though used in World War I by the British, the results were considered not good and its only consistent exponents have been a group of Canadian surgeons. The authors, American army surgeons, have done seventy-five Syme amputations during the past three years, and proclaim it very satisfactory providing certain details are carefully observed. They have had no case with a Syme operation in which the patient would prefer any other type of amputation.

The Syme is the best major amputation for the lower extremity, giving longer leverage, full weight bearing with or without prosthesis. Psychologically, the patient considers himself merely inconvenienced, not really handicapped; there is no necessity for a pelvic band. The Syme stump is preferable to any short foot stump. But it requires greater skill on the part of the surgeon than any other amputation.

The operation should not be done in the presence of an open wound until cultures are negative, never for peripheral vascular disease, nor in the presence of peripheral or central nervous lesions: there should always be sufficient plantar skin with nerve and blood supply intact. The Syme amputation is preferable in the case of young men who have traumatic loss of greater part of the foot, providing there is at least one inch of good plantar skin on the heel.

The technique used by the authors is carefully described and illustrated, including the postoperative bandaging, temporary pylon and permanent prosthesis fitting.

BURNS PLEWES

Appendicitis in Cleveland. Green, H. W. and Watkins, R. M.: *Surg., Gyn. & Obst.*, 83: 613, 1946.

An immense study of acute appendicitis over the period 1930 to 1942, including 19,399 cases and with the help of many doctors, was undertaken by the Cleveland Appendicitis Survey Committee. This final report summarizes the findings especially in regard to finding (1) the best procedure relative to anæsthetic, incision, and drainage; (2) the effect of various factors on recovery: sex, age, delay, laxative, condition of appendix, anæsthetic, incision, drainage, surgeon, hospital, year, economic status.

Those with unruptured appendices (75%) suffered a fatality rate of 0.9%, while those with ruptured appendices had a rate of 18.7%. There was no differences in fatality rates as regards sex. The younger the adult the lower the fatality rate. The less delay, the lower the rate. Cases that had no laxative had slightly lower fatality rates, but the increase in laxatives increased the proportion that ruptured. Spinal anæsthetic showed a lower fatality rate than general anæsthetic, as did also those which had a McBurney incision. Under all conditions, cases that were not drained had a lower rate than those with drainage. There was no significant difference between public cases, usually operated upon by residents, and private cases. No opinion is expressed on differences in hospitals, year, or economic status except as spinal anæsthetic, no drainage, and shortened

delay became more common practice in various hospitals. In groups of patients over fifty and under five years, fatality rates were twelve times the five to twenty-nine year old group in unruptured cases, twice in peritonitis cases.

This careful statistical study gives firm support to many teachings regarding appendicitis widely believed by practising surgeons. Spinal anæsthetic lowers the mortality; residents get just as good rates as staff; there is a definitely better rate with the McBurney incision and drainage should not be routine, even in patients with peritonitis.

BURNS PLEWES

Management of Sharp Pointed Foreign Bodies in the Gastro-intestinal Tract. Best, R. R.: *Am. J. Surg.*, 72: 545, 1946.

Those who have had the greatest experience in the management of individuals who have swallowed sharp-pointed foreign bodies advocate careful observation and non-surgical treatment. An open safety pin is a potential hazard for bowel perforation. But, though gastrotomy, ileotomy, or colotomy carries little danger, expense is a factor in private practice, and the danger of an epidemic of swallowing pins in penal institutions, if such operations are done, argue against the practice.

Sharp-pointed instruments pass through the gastro-intestinal tract without perforation so often because of the trigger reaction of the bowel wall muscle, which rejects the foreign matter in most instances. Needles travel most slowly, an open safety pin is slower than a closed one, and a nail, being sharp at one end only, travels at a rate between the needle and the safety pin.

If x-rays show that the sharp-pointed foreign body has been stationary for over twenty-four hours, careful watch for tenderness, rigidity, changes in pulse, temperature and white count should be kept. There seems no indication for a special diet, except small doses of mineral oil several times a day. No patient in the series of twelve complained of distress as the object was expelled. Surgery should not be instituted on history alone. Two of the twelve cases were operated upon, one seemingly unnecessarily.

BURNS PLEWES

Acute Superior Mesenteric Thrombosis. Meyer, H. W.: *Arch. Surg.*, 53: 298, 1946.

The author reports the case history of a battle casualty, an infantryman, 19 years of age, who developed an acute superior mesenteric artery thrombosis following shell fragment wounds of the left arm and right thigh. Following removal of the foreign body from the right thigh, he was up on the third day and had made a good recovery. On the evening of the same day, shortly after eating his supper, he developed severe pain in the upper abdominal region followed by vomiting and diarrhoea.

At operation, a thrombosis of the superior mesenteric artery was found at a point just distal to the origin of the midcolic artery, with necrosis of all but the upper 18 inches approximately of the jejunum, and all of the large bowel up to the midtransverse colon. Resection of the necrotic bowel and a jejunocolostomy were performed. Four weeks later, he developed a thrombosis of the right popliteal artery for which an embolectomy was performed. He made a good recovery.

G. E. LEARMONTH

Chemosurgical Treatment of Cancer of the Nose. Mohs, F. E.: *Arch. Surg.*, 53: 327, 1946.

According to the author the term "chemosurgery" was coined to designate a newly developed method for the microscopically controlled excision of certain accessible forms of cancer. This term omits mention of the thorough microscopical control of excision afforded by the technique, because this control is the most important and only entirely new feature of the method.

After the application of dichloroacetic acid to the carcinomatous lesion, zinc chloride fixative Z-108a was made in an even thickness of about 0.5 mm. and covered

with a thin cotton dressing. On the next day, a layer of fixed tissue 1.5 mm. in thickness was excised with a scalpel and the entire area was divided into six specimens so that a systematic microscopic search for the cancer could be carried out. Frozen sections were cut through the under surface of the specimens which were examined microscopically, and the areas were marked on a paper map of the lesions diagrammatically shown. These procedures were repeated daily on subsequent occasions to localize and check the progress of the lesion.

There was an unusually high proportion of successful results. For basal cell carcinoma, 98% of 202 cases observed for six months or more, 97.2% of 109 cases in the three-year period and in 94.3% of 53 cases in the five-year period. For squamous cell carcinoma, the rate of cure was 93.9% for 33 cases in the six-months' period, 87.5% for the 16 cases in the three-year period and 81.8% for the 11 cases in the five-year period.

G. E. LEARMONTH

Plastic Surgery

Tendon Transplantation in the Hand. May, H.: *Surg., Gyn. & Obst.*, 83: 631, 1946.

A tendon defect is either due to destruction of a tendon from trauma or disease, or to contraction of the muscle belly after severance of its tendon. In either case, return of function can be expected only if the defect is bridged with a suitable tissue graft.

Many means have been tried to bridge a tendon gap, but the consensus at present is in favour of autogenous tendon tissue. Aside from the regeneration of tendon, the rôle of the gliding tissue is of interest and importance. Unless the gliding tissue of the host area is preserved, a paratenon covered tendon graft must be transplanted, or gliding tissue be supplied as a free graft. Stiff joints, which cannot be moved passively are a contra-indication to a tendon graft. Operation must be done under tourniquet and operative trauma reduced to a minimum. Scar tissue must be carefully excised until only healthy tissue is left.

If the tendon defect is in the palm and involves the sublimis and profundus tendons, it is agreed to repair only the profundus. The source of the graft may be the proximal part of the sublimis in such case; other sources of graft are discussed. The graft should be under slight tension in its new position. The suture lines in the tendon should not co-incide with suture lines in overlying soft tissue and consequently secondary repair of freshly cut tendons is indicated in the majority of cases.

Early active movement after tendon suture is likely to cause, rather than prevent, adhesion due to irritation of the surrounding tissues and to disturbance of vascularization of the tendons and active movement should not be allowed for two and one-half weeks after suture or graft.

L. T. BARCLAY

Obstetrics and Gynecology

Abnormal Presentations Among Malformed Infants. Young, R. L.: *Am. J. Obst. & Gyn.*, 52: 419, 1946.

The methods of presentation of 1,471 congenitally malformed fetuses weighing over 400 gm. are reviewed. They are compared with the presentations of all infants weighing over 400 gm. which were delivered at the Chicago-Lying-in Hospital over a 6½-year period. Among the malformed group, breech, transverse and face and brow presentations occurred four times as often as they did among the control group. Among malformed fetuses weighing 2,500 gm. or more, breech, transverse, and face and brow presentations were seen approximately seven times as often as they occurred among that portion of the control group which weighed 2,500 gm. or more.

In an attempt to learn the reason for the many abnormal presentations among malformed fetuses, the factors claimed to be of etiologic importance in the

production of abnormal presentations are reviewed. Most critical studies in the recent literature agree that of these many factors, only prematurity and fetal malformations occur often enough to explain more than a very few abnormal presentations. The relationships of the alleged factors to fetal malformations have been studied and their significance is shown to be either non-existent or very slight.

Deflexion attitudes have been shown to occur very frequently among malformed fetuses. They have also been reported to occur in over 80% of all breech presentations among normal fetuses. Evidence is presented which suggests that in the various groups of malformed fetuses which present abnormally with the greatest frequency, the malformations have caused a deflexion attitude. It is felt that this factor explains more satisfactorily than any other the unusual frequency of abnormal presentations among malformed fetuses. It is also felt that this study affords additional evidence to confirm the importance of deflexion attitudes in the etiology of abnormal presentations among normal fetuses.

ROSS MITCHELL

Absorbable (Oxidized) Gauze as a Hemostatic Agent in Gynecologic Surgery. Studdiford, W. E.: *Am. J. Obst. & Gyn.*, 52: 495, 1946.

Absorbable gauze has been utilized in 30 gynecologic patients to control hemorrhage. Among these cases there was an equal number of abdominal and vaginal procedures. When properly applied, it was uniformly effective in controlling hemorrhage. No reaction was observed attributable to the presence of absorbable gauze in closed cavities. It was particularly useful in the control of secondary vaginal hemorrhage.

ROSS MITCHELL

Fetal Mortality in Breech Delivery. Dieckmann, W. J.: *Am. J. Obst. & Gyn.*, 52: 349, 1946.

Breech delivery has a gross mortality of 7.7% corrected to 4.2% for term fetuses on maternity service. The mortality in prematures is over 25%. The breech deaths are due to prematurity, intracranial injury, asphyxia, and a small number of visceral injuries. External cephalic version should be attempted repeatedly, but no undue force and no anaesthesia are to be used.

A systematic outline for the management of breech delivery is given, but each case must be evaluated individually. The important steps are: (1) prompt recognition of abnormal labour; (2) delivery if no descent for one hour and cervix is completely dilatable; (3) deep surgical anaesthesia; (4) deliberation in delivery; (5) deep episiotomy; (6) Potter technique for delivery of shoulders; (7) the Celsus-Wiegand-Martin manoeuvre for delivery of the head or combined with forceps. Caesarean section should be used more frequently in primiparas at term with large babies presenting by the breech.

ROSS MITCHELL

Pædiatrics

Multiple Sclerosis in Childhood. Carter, H. R.: *Am. J. Dis. Child.*, 71: 138, 1946.

With the exception of syphilis, multiple sclerosis is the most common primary disease of the central nervous system, yet it is rather uncommon in children. Of 711 cases at the Neurological Institute of New York, 73 or 10.2% were between the ages of 10 and 17. The diagnostic criteria for children should be the same as for adults. It is essentially afebrile with a chronic remitting course in which the varied components of the central nervous system may exhibit symptoms of disrupted function. As the disease develops, there may be noted rapidly developing central scotomas, exacerbations and remissions in visual acuity, transient diplopia, pallor of disks, spastic paraplegia, paraparesis, hemiplegia or monoplegia, loss of abdominal reflexes, ataxias, intention tremor, numbness, paresthesias, loss of vibration and position sense, alterations in speech, nystagmus,

transient sphincteric disturbances, changes in emotional expressions, apathy, mild dementia, and neurotic or hysterical manifestations. These symptoms are exhibited in the forms of acute or subacute exacerbations. Remissions which follow are sometimes complete but usually partial. Four typical cases are presented with recurrent exacerbations.

The onset of the disease may develop suddenly within a few days and it may be impossible to distinguish it from acute disseminated encephalomyelitis. The latter condition fails to have a subsequent course of exacerbations and remissions. Ferraro has stated that acute multiple sclerosis, acute disseminated encephalomyelitis, and neuromyelitis optica cannot be differentiated histopathologically. This observation is equally true for the clinical experience of most neurologists. The condition must be distinguished from Leber's optic atrophy, familiar cerebellar ataxias, Marie's cerebellar ataxia and Friedreich's ataxia. Tumours of the brain stem will often produce confusing and scattered effects suggestive of multiple sclerosis.

Despite all attempts at different forms of treatment, there is no known effective treatment. The author discusses various possible etiological factors, admitting that the true cause is not known.

PRESTON ROBB

Industrial Medicine

Supervision of Health in Small Plants. Jones, F. M.: *Canad. J. Pub. Health*, 37: 345, 1946.

In this article the author outlines the scope of an industrial medical service. After discussing the functions of this service and the duties of the medical personnel, he indicates the potential benefits to be expected and suggests a method of appraising the efficiency of the medical department.

A good medical officer with a genuine interest in industrial medicine is the most important consideration. Equally essential is his position in the plant; he must have access to works management. Knowledge regarding the toxicology of materials handled and of processes, and recognition of the need to co-operate with other departments and with the management, are prerequisite to his success in the plant. An adequate medical program includes physical examinations, preplacement and periodic, and monthly ones for workmen exposed to health hazards; it provides treatment for minor injuries and illness while at work and arranges further care for more serious cases; it provides health consultations, and offers leadership in the hygiene of the working environment. Arrangements for chest x-ray service are also included. An adequate record system is important.

After explaining the function of the nurse, the author presents briefly the value of the medical program as shown by reduction of accidents and cases of occupational disease, reduction of lost time due to illness and to accidents; improvement of employee-relations, and reduction of labour turnover. By using the "visit rate" to the medical department and the cost per visit, the author suggests a procedure whereby a medical service may be evaluated. His experience has revealed that when an adequate medical program is provided, from a working population of men and women in equal numbers, approximately 12 visits per worker per year are made to the medical department. If the visit rate is above or below this, the medical service in that plant should be investigated. The cost per visit can be computed by using 12 visits per worker per year as a standard.

MARGARET H. WILTON

Colour in the Factory—Four Years' Experience. Bickerdike, J. B.: *Indust. Welfare*, July-August, 129: 1946.

The experience of one factory which used colour to improve the working environment for their staff, and their plans for further experimentation along that line, are discussed briefly in this article.

In 1942, a large factory making heavy electrical equipment, with a view to compensating for the dis-

comfort, fatigue and unpleasantness of the blackout, adopted a colour scheme in their plant. The painting of the factory layout was planned as a whole; every effort was made to develop a sense of freedom, rather than one of oppressive enclosure. The principal areas such as walls, ceilings, and bodies of machines were painted cream; the lower parts of walls and certain parts of the machines were green, while any part such as a danger signal or a guard, where distraction was desirable, was given a saturated hue. Orange has a higher visibility than red and was found to be very satisfactory.

Four years' colour experience in this factory proved successful both in effect and maintenance. It was found that contrasting colours on different parts of the same machine are of value as there is a tendency for uniformly coloured objects to lose their identification in the three-dimensional sense. The maintenance was not costly. The light paint created an incentive for operators to maintain machines in a clean condition.

The firm plans to experiment further with tonal differences on different parts of the same machine and with localization of tones of colour for particular jobs. They will investigate the use of such colours as red to stimulate a man on a monotonous operation and the effect of colour contrasts on morale.

MARGARET H. WILTON

Neurology

Cleidocranial Dysostosis with Psychosis. Kilgore, S. and Lasker, G. W.: *Arch. Neurol. & Psychiat.*, 56: 401, 1946.

Cleidocranial dysostosis is a rare developmental disease of the skull, bones of the face, teeth, clavicles, vertebrae, pelvis and phalanges. In fact it sometimes involves the whole of the skeleton. The prominent feature is the absent clavicles. The condition is ordinarily inherited as a mendelian dominant. Its incidence is similar in the two sexes and in all races and age groups. A good review of the literature and a description of the variations of the condition is presented.

In the case described as well as the physical deformities, the patient after graduating from engineering school developed a form of schizophrenia in which the psychological reactions to his peculiar physical appearance provided the basis for much of the colour of the content. It was not felt that the psychosis bore any particular relationship to the cleidocranial dysostosis. It was interesting that the father had the bony abnormalities without a mental disturbance.

PRESTON ROBB

Etiology and Pathogenesis of Acute Sporadic Disseminated Encephalomyelitis and Multiple Sclerosis. Margulis, M. S., Soloviev, V. D. and Shubladze, A. K.: *J. Neurol., Neurosurg. & Psychiat.*, 9: 63, 1946.

This work comes from Russia. These authors feel that the lesions of multiple sclerosis are of infectious origin. Two strains of filterable viruses were isolated from two cases of acute encephalomyelitis. The strains appeared to be identical but differed from other known strains of neurotropic viruses encountered in man. The two cases are described. The first case might well have had multiple sclerosis or some form of encephalomyelitis, but if so there were some very unusual features. Albino mice were inoculated with the patient's blood and c.s.f. A virus was isolated from the blood after the second passage. The patient was treated with a course of vaccine therapy. The second patient died and the histological examination proved the case to be identical with others of acute encephalomyelitis. Albino mice were inoculated and the virus was isolated after the first passage.

Albino mice, puppies, rats, guinea-pigs, and rabbits were inoculated with both strains. Rather characteristic lesions were found at autopsy. Small necrotic foci and zones of demyelination were the earliest changes in the C.N.S. of animals infected with the virus from these two patients. The similarity of morphological changes encountered in acute disseminated encephalomyelitis to

those of multiple sclerosis and experimental encephalomyelitis in animals inoculated with the virus from the two patients suggested that these viruses might play an important part in the etiology of acute encephalitis and multiple sclerosis. They were unable to obtain a virus in patients suffering from chronic multiple sclerosis.

Neutralization studies showed that antibodies neutralizing their virus strains were present in the serum of a large number of patients suffering from acute encephalomyelitis (70%) and multiple sclerosis (50%) but no such neutralization could be obtained using the blood of healthy individuals or from patients with other diseases of the nervous system.

From their studies they concluded that the virus strains isolated from their cases were able to produce in inoculated animals pathological changes in the nervous system closely resembling those of acute encephalomyelitis and multiple sclerosis. These virus strains could be neutralized by sera obtained from patients with these diseases. This latter ability provides evidence of specificity of the virus in respect of acute encephalitis and multiple sclerosis.

It is their opinion, along with others, that acute disseminated encephalomyelitis and acute multiple sclerosis are identical. A small number of cases were subjected to specific vaccine therapy prepared from the animals. Of 19 cases, 11 were improved, 8 were either not improved or were worse.

PRESTON ROBB

Re-education in Aphasia: A Review of 70 Cases. Butfield, E. and Zangwill, O. L.: *J. Neurol., Neurosurg. & Psychiat.*, 9: 75, 1946.

The authors report the results of training in patients with aphasia following a brain injury. The work was done at the Brain Injuries Unit, Edinburgh. The methods used are outlined. Each patient was treated according to his needs and the type of aphasia from which he suffered. Seventy cases were reviewed. Treatment in 14 of these cases was begun six months or more after the onset of the disorder when relatively little spontaneous recovery was to be expected. The results were considered in relation to the various aspects of language affected (speech, writing, reading and calculation) and to the type, severity and etiology of the dysphasic condition. The results suggested that the most favourable outcome was obtained in traumatic cases, and in those whose symptoms were relatively mild and predominantly on the expressive side. Two-thirds of the patients given re-education treatment were settled in economic employment.

PRESTON ROBB

OBITUARIES

Dr. Henri Beaulac, est décédé, le 15 novembre à Trois-Rivières, à l'âge de 59 ans.

Le Dr Beaulac, né aux Trois-Rivières, avait fait ses études au séminaire de cette ville et à l'Université Laval.

Sa femme ainsi qu'une fille et quatre fils lui survivent.

Dr. Charles Reginald Bourne, died in Montreal on November 27. He was 67 years of age.

Born in Florence, Ont., Dr. Bourne spent his early days at New Westminster, B.C. and from 1896 to 1906 was a druggist in northern British Columbia. He moved to Montreal where he attended McGill University and graduated in medicine in 1912. He accepted a resident appointment at the General Hospital and three years later was appointed medical superintendent. He began private practice in 1916 in which he remained until his death and he also served as assistant physician of the General Hospital until 1945 when he was appointed to the consulting staff. In addition, Dr. Bourne lectured for many years at McGill.

He was a member and past master of the University Lodge of the Masonic Order and was an enthusiastic member of the Lanthier Fish and Game Club.

He is survived by his widow, three sons, a brother and a sister.

Dr. Ernest Edgar Cleaver, died in Toronto, November 17, 1946. He had been sick for several months but had apparently recovered and had resumed his office practice and was about to move to a recently purchased house.

Dr. Cleaver was born in Merriton, Ont., and had his primary education in Winnipeg and in Victoria, B.C. He graduated M.B. from the University of Toronto in 1906 and took postgraduate study at Johns Hopkins University and practised for a time in New York. He served with the R.C.A.M.C. in the first Great War and returned to Toronto to join the staff of the Toronto General Hospital as a specialist in gastro-enterology. In 1931, he became a Fellow of the Royal College of Physicians of Canada. For twenty-five years he was prominent as a teacher and consultant.

Dr. Cleaver was held in respect and affection by a large circle of his colleagues and will be gratefully remembered by the host of students who had the good fortune to come under his teaching. He was generous and tolerant and had a genius for friendship. His sense of humour was keen but always modified by a kindness that showed itself in every circumstance.

Dr. Cleaver never forgot his heritage and was an earnest supporter of religion and philanthropy. He was active in the Academy of Medicine Toronto, having served as Chairman of the Section of Medicine and elective member of Council. He was on the House Committee for many years. He was also a founder of the Caduceus Club.

Dr. Cleaver is survived by his widow, the former Lillian Sharpe and by his daughter, Mrs. Harry R. McKnight and his sister, Mrs. H. M. Purser.

Dr. Kenneth Lee Craig, died at Campbell River, B.C., in October, 1946, aged 49.

Dr. Craig won a host of friends, and his devotion to his chosen profession made him indeed a leader therein. Many will remember his unvarying courtesy, his charm of manner, and the very many acts of real kindness he did towards the less fortunate. Truly, it can be said that, as a medical practitioner and as a man, he left a lasting impression in the district which was favoured as the locale of his years of devoted service.

In 1941, Dr. Craig answered his country's call, and, as might have been expected his talents and skill were speedily recognized. He served as second-in-command at Gordon Head, and later, with the rank of Lieut.-Col., was chief of the Alberni Military Hospital at Nanaimo, and retired from the service last January.

He leaves a widow and one daughter.

Frederick Brecken Day, died at Thorburn, Pictou County, N.S., after a week's illness, on November 8, 1946, at the age of 71 years. Born at Gabarous, Cape Breton, he graduated in Arts from Mount Allison University in 1895, and in Medicine from the University of Toronto in 1904. After practising for six months in Westville he moved to Thorburn where he practised until his death. During Great War I he served with distinction and won the Military Cross while with the 54th Battalion.

Dr. G. F. Day of New Glasgow is a son and Dr. Frank Parker Day of Yarmouth, is a brother.

Dr. Howard Price Folger, 50, of Kingston, Ont., died on November 22, 1946, in the Kingston General Hospital following a severe heart attack.

Born in Kingston, a son of the late Mr. and Mrs. Howard Folger of this city, he was educated in the public schools and Kingston Collegiate Institute. He graduated in arts from Queen's University in 1917, and in medicine in 1922. Following his graduation

he interned at St. John's Hospital, New York City, and also at Brooklyn, N.Y., Eye, Ear, Nose and Throat Hospital for two years. He spent two years studying at Vienna, and returned to this city, where he opened practice about 20 years ago. He became professor of ophthalmology at Queen's University and was vice-president of the Canadian Ophthalmology Society.

He was a member of Ancient St. John Lodge No. 3, A.F. & A.M., the Kingston Yacht Club and the Cataraqui Golf and Country Club, also St. George's Cathedral and the Scottish Rite.

He is survived by his widow, one daughter and two sisters.

Docteur Stanislas Gaudreau est décédé à Québec le 30 octobre, à l'âge de 74 ans. Le docteur Gaudreau était un citoyen distingué et un médecin réputé.

Dr. Richard Henry Moore Hardisty, D.S.O., M.C., a physician on the staff of Royal Victoria Hospital for 32 years and lecturer at McGill University, died November 12, at the age of 68.

Born in Fort William, Dr. Hardisty came to Montreal at the age of seven. In 1903 he graduated in medicine from McGill University and became an intern at Royal Victoria Hospital, being appointed to the staff in 1911. He retired to the honorary attending staff in 1943.

He joined the staff of the medical faculty of McGill University as a part-time demonstrator in 1912, later becoming a lecturer and in 1941 became attending physician of Royal Victoria College. In 1945, he was made physician of the department of physical education.

Dr. Hardisty joined the Royal Canadian Army Medical Corps at the outbreak of World War I and went to the front with the No. 6 Field Ambulance Corps, later being promoted to the rank of Lieut.-Col. and the command of the unit.

He was a nephew of the late Lady Strathecona, a member of the Royal Montreal Golf Club and the University Club.

He is survived by his widow, the former Elizabeth Porter, of Montreal, and a brother, Alfred.

AN APPRECIATION

Thou must be like a promontory of the sea, against which, though the waves beat continually, yet it both itself stands, and about it are those swelling waves stilled and quieted.—Marcus Aurelius.

Dick Hardisty was an old-fashioned physician of the best type; the youth and specialism of today need to emulate him. He was educated in a great school, for the old Montreal High in his time was unique in this city and gave a good education, but above all produced men of steadfast principle and character. Then later, he was at McGill for eight years, in her comparatively early and more intimate days, and at the Royal Victoria Hospital as an intern in its very infancy. Then came general practice in Sherbrooke, with its tribulations, triumphs, and trials, especially long country drives in the freezing cold weather, until his hands almost froze on the reins. After that a year abroad: then again the Royal Victoria as a junior assistant; Field Ambulance Medical Officer from start to finish of World War I, winning the D.S.O. and M.C.; his return as O.C. of his original Unit; then settling down to practice in Montreal and at the Royal Victoria Hospital as an internist for the rest of his life.

That was Dick Hardisty—a man of inviolable character, following a straight line, for when he once made up his mind, he was not to be turned from the path of duty. Modest and unassuming, always dignified but never pompous, sympathetic and a lover of mankind, steadfast as a rock, true to his friends and patients—he was much loved.

DR. H. P. WRIGHT

Dr. Chester Houston, 72, anæsthetist and radiologist at the Prince Edward Island Hospital in Charlottetown for the past 15 years died November 16.

He was a native of New Glasgow, P.E.I., and after he graduated from McGill University in 1898 practised medicine at Crapaud, Kensington and Souris before coming here.

He is survived by his widow, a son and three sisters.

Dr. Houston Irwin, of Pembroke, Ont., died November 17, 1946, at the age of 76.

Dr. Irwin was born in Pembroke and was a graduate in medicine in 1889 from McGill University. For 30 years he practised in Pembroke, where he served for some time on the town council. For the last 16 years he had practiced in Bonfield and held the office of M.O.H. He was a member of the United Church, the I.O.O.F. and the Masonic order.

Surviving are his widow, a daughter and a son.

Dr. Albert Jinchereau, est décédé le 25 octobre, à Québec, à l'âge de 68 ans.

Parmi la famille en deuil sont deux fils et quatre frères.

Dr. A. J. Lafleur, Montreal physician, died suddenly November 2, in his 60th year.

Dr. Lafleur was born at St. Pierre les Becquets, and studied medicine at Laval University. He served in the Army during the Great War. In 1919 he entered St. Justine Hospital, where he held various posts as a general practitioner and as a specialist in tuberculosis. He was to have become examining physician at the out-patients department the morning of his death.

He is survived by his widow.

Dr. B. Wesley MacDonald, passed away at his home in Ottawa, on November 8, following a brief illness. He was born in Ottawa in 1893.

Following his early education here, he attended Queen's University, and upon graduation in 1924, took a three-years' postgraduate course in New York.

He returned to the Capital, where his practice gained him wide prominence.

Ardent in sports, Dr. MacDonald at one time played football for Queen's. He was also interested in boxing and hockey and for several years was club physician for the old Ottawa Rangers football team. He was a member of the Masonic order, Queen's Lodge, 578, Kingston.

He is survived by his mother, a brother and a sister.

Dr. Neil John Maclean, a leading surgeon of Western Canada, died at his home on November 13, after a brief illness. Born at Lindsay, Ontario, March 17, 1870, he moved with his family to Winnipeg in 1882. He was educated in Manitoba College and graduated from Manitoba Medical College in 1898. After serving as a house surgeon in Winnipeg General Hospital, he went to England where he obtained the L.R.C.P., M.R.C.S. degrees. Later postgraduate studies were pursued at Chicago, Berlin and Vienna. In his early years he was attracted by the surgery of the late Dr. Alexander Hugh Ferguson, whose life and work he set forth in the Masters of Surgery series in *Surgery, Gynecology and Obstetrics*. Many other articles from his pen were published in the *Canadian Medical Association Journal* and other journals.

At various times Dr. Maclean was surgeon to the Winnipeg General Hospital, St. Boniface Hospital, the Children's Hospital of Winnipeg, Tuxedo Military Hospital, and Manitoba Sanatorium at Ninette. For some time he was associate professor of surgery in Manitoba Medical College. In addition to his British degrees he was a Fellow of the American College of Surgeons and a Fellow of the Royal College of Surgeons (Canada). He was an active member of the Western Surgical Association. He assisted in the revival of the Canadian Medical Association after World War I.

In 1941 he organized in Winnipeg the Maclean clan and was active in bringing its membership to between 200 and 300.

After the first World War he organized the Maclean-Gunn Clinic, later the Maclean-Thorlakson Clinic, which expanded to become the Winnipeg Clinic. In this Dr. Maclean was senior consultant.

He is survived by his widow, three daughters, three sons—Dr. Ian S. Maclean and Dr. Bruce Maclean of Winnipeg and Dr. Alistair D. Maclean of Elkhorn, Manitoba, and eight grandchildren. Another son, Capt. Donald S. Maclean of the First Canadian Paratroop Battalion, died on the Normandy beaches on D-Day, June 6, 1944.

AN APPRECIATION

Dr. Neil John Maclean was a kind man, the sort people gravitated toward for advice and help, for he always responded. Though he was deliberate to the point of slowness, he must have early known what he wanted to do. Before he started to do surgery, he did European postgraduate work; afterwards he continued his visits to other cities of both continents, keeping up with ideas and techniques. His own clinic must have been the first of its kind in Canada; co-operation among doctors was not universal when he started. To others in the profession he was extremely generous. He was a prop to the weak, his surgical skill went beyond the mechanics of healing to the spirit of the patient; a precious Sunday afternoon would often be given up to a soul lost and frightened by malignancy. His patients were strengthened after they had passed on their fears to him. His was intelligence of the heart.

His family life was tumultuous. The seven children, seemingly about the same age, with visitors and extras and the interruptions of a busy doctor's phone attached to a long extension cord, made dinner there an excitement to a fledgling doctor in the twenties. Guests caused no visible effort to anyone, they were just part of the normal household pattern. Children's life and fun, emergencies and phone calls bringing demands from old and new friends moved around his grave and considerate person.

He had the simplicity of a great spirit. The manner of his death seemed fitting; the final illness, not thought to be serious, came to him at home, unexpectedly, where he died without fanfare, special nurses or consultants. In him Canadian medicine has lost a very great gentleman.

LILLIAN A. CHASE

AN APPRECIATION

Neil John was fortunate in his birth. His parents were Scottish, better than that, they were of the Northern Scots, and better still of the Hebrides. The mantle of heredity clothed him, protected him, and lasted him to his life's end like a chain covered with a silken film. It caused him to lead a life that was at once unhurried, purposeful and successful. His success did not come in fits and starts, by accident or by what we call fortune. He did not waver or follow false leads, but he kept to a plan. No short cuts or changes of plan harassed him. The plan taught him to be diligent above all else; to burn the midnight oil, to count each day lost whose late descending sun saw by his hand no worthy act performed.

He was not boisterous in his humour, but humour he did not lack. Nevertheless it spread smiles and gladness over all within reach, sometimes it was tinged with sadness or as Carlyle well said, "Always there is a black spot in our sunshine, and it is even the shadow of ourselves". His manner of speech, his questioning eye, his careful garb, added to his dignity and made him a man of marked personal charm.

After many years of contact with Dr. Maclean I would say that the words which describe him best are honesty, industry, thoroughness and sympathy. These qualities made him what he was, the best and most skilful surgeon in North Western Canada. In addition to his expert hands and his unerring judgment he had a profound knowledge of scientific medicine, and a bed-side manner that won the confidence of all patients with whom he came in contact.

His personality was such that he did not indulge in blatant controversy with his fellow practitioners. One might say truthfully that the noise of his contemporaries disturbed him and the discussion of domestic or political problems did not interest him. He spent a good deal of time in silent thought, in which his eye was directed inward to the exploration of a thousand regions in his mind. He was a puzzle to me, but yet he was so sincere and so earnest that the enigma should have been easily overcome. What he lived for was not perfection in the art of surgery, but the building of a character of a good man and a worthy citizen. In these efforts fortune was with him. He had the knowledge and he had a thousand opportunities of putting his knowledge and his skill into the service of all with whom he came in contact.

He chose his friends with a fine discrimination; he was pleased with knowing the best of them, but embarrassed by the company of fools. Thus his nature had made him meritorious and fortune provided the opportunity of bringing his good qualities into play. It is not sufficient to have good qualities, but we must be able to make the proper use of them.

He was always hopeful, and while hope often leads to error it serves to conduct us through life. He was not a voluminous talker and was guided by the thought that eloquence consists in saying all that is necessary and nothing that is unnecessary.

The accent of a man's native country dwells in his mind and heart. He sits by an open fire, the warmth of which brings him content, and its light illumines the past; perhaps he dreams and in his dreams beholds the Hebrides. Neil John's progenitors were from the Western Isles of the North of Scotland, so well described in the Canadian Boat Song. "From the lone shieling of the misty islands, mountains divide us and a waste of seas, but still the blood is strong, the heart is Highland and we in dreams behold the Hebrides!"

E. W. MONTGOMERY

(The following tribute has been paid to the late Dr. A. E. Medd of Winnipegosis, whose death in August, 1946, was recorded in our October issue. It was written by Mr. Kenneth M. Haig of the "Winnipeg Free Press".—EDITOR)

It is curious in Manitoba how soon the pavement loses itself in the trail, and how presently the settlements thin out until there they are outposts of the wilderness. Winnipegosis is one of these, up on the lake of that name, and out from it are a few farmsteads and further still Indian reservations and along the shore line the cabins of the half breeds. It is a few weeks now since, out there, "Our Doc" died. One thing about outpost communities, they have time to mourn their dead. So it is that Dr. A. E. Medd's name remains in that place vividly alive.

He went there in 1909 when he graduated from the Medical faculty, Manitoba University. He knew the country somewhat. After all, it was his native province, but it is a long way from the rolling wheat fields and cattle on a thousand hills of Brandon, and this fishing community by the Lake.

When Winnipegosis has money it is very very flush, and when it is broke, it is stoney. Not that bank accounts mattered much to the Doctor. The healing of the sick was what mattered. And there he was on trails and no trails, chiefly the latter, with horse and buggy, on horse back, or sometimes, when the going was tough and the need insistent plugging along on foot.

It seems sometimes now, that his old friends and patients see his long, lean, sandy-haired person coming along the road or hear the rattle of his car. Surely he cannot have left them forever! Surely he will be in his place at the meeting of the School Board; surely he will be on "Main Street" Saturday night to give greeting to some of his babies, thirteen hundred of them, that he brought into the world, or to seek out his cronies to arrange a shooting trip. Perhaps it will be a new species of bird he has discovered! Perhaps it is time

the tennis club opened. Or when the drums of war beat, it may be a Red Cross or recruiting drive.

Winnipegosis cannot quite get used to it, the absence of "Our Doc".

They are missing him too out on the Indian reservations, Shoal River, and Waterhen, and Crane River, Pine Creek and Swan Lake. So they are in the half breed cabins, for Dr. Medd never refused a call to his dark-skinned brothers and never slacked his care for them. Winnipegosis has the memory of the time diphtheria struck at Duck Lake, fifty miles north of the town.

They can see Dr. Medd packing into the Provincial Fisheries branch snowmobile, a contraption with skis and a caterpillar engine, and off he was across the ice hilled lake, bobbing and bunting and the wind circling. He got there though with his toxoid and antitoxin.

They have another picture too. It is of the jigger on the railway skyline with its bundled patient and the Doctor and helper pushing. It is on its way to the Dauphin hospital. There is a bit of a catch to this for, sometimes, the Doctor had to pay the transportation as well as forgetting all about his own bill.

So a country medical practitioner of Manitoba died. He left behind him a great wealth of intangible things, among them a heritage, all unknowingly built up through the years, which touches with light his own beloved calling.

Dr Charles-Auguste Raymond, est décédé à Neuville le 11 novembre.

Le Dr Raymond était né à Deschambault en 1890. Il avait fait ses études au séminaire de Québec, puis à l'Université Laval d'où il avait gradué en médecine en 1912. Il avait ensuite pratiqué la médecine jusqu'en 1938 à Donnacona. A compter de cette date, il s'était retiré à Neuville. Toujours, il s'était intéressé à la musique et c'est sur ses instances que sa fille Madeleine se consacra définitivement à l'étude de cet art où elle excelle aujourd'hui non seulement comme exécutante mais comme improvisatrice.

Survivent au défunt, sa femme, deux fils et quatre filles.

Dr. Lawrence V. Redman died of a heart attack on November 25 in Toronto,

Born at Oil Springs, Ont., Dr. Redman was 66 years old. He graduated in arts from the University of Toronto and was a fellow at the university from 1908 to 1910. Assistant professor at the University of Kansas for four years, he was active in researches on synthetic resins. Prominent for many years in scientific circles in Chicago and New York, he had resided on his farm near Burlington since his retirement 14 years ago.

Dr. Redman became president of the Redmanol Products Co. of Chicago in 1914 and with the merger of the company with Bakelite Corporation, was appointed vice-president and director of research. Elected president of the American Chemical Society in 1931, Dr. Redman also served as chairman of the Chicago section and later the North Jersey section.

Many honours were conferred upon Dr. Redman, the honorary degree of Ph.D. from the University of Toronto, and D.Sc. from McMaster University. He was awarded the Graselli Medal for the best article on chemistry and was also the winner of the gold medal awarded by the Society of Chemical Industry of Great Britain for the most outstanding contribution to chemical science during that period.

He was a fellow of the Canadian Institute of Chemistry, Toronto Arts and Letters Club, Sigma Xi and Alpha Chi Sigma fraternities.

Dr. Redman is survived by his daughter, and a son.

Dr. William Dixon Scott, aged 87, dean of Peterboro medical men, died November 26. He retired in

1934. A farm accident that necessitated amputation of a foot, turned him to medicine in his youth. He was a horse-and-buggy doctor in the early days of the century and served a large rural area where travel was difficult.

Dr. A. J. Slater died on October 26 at the age of 73. Born in Galt, Ont., he attended the collegiate institute there, then came to Winnipeg in 1899. Five years later he graduated from Manitoba Medical College. He practised for a year in Emerson, then returned to Winnipeg and for a number of years was anaesthetist at St. Joseph's Hospital and received special recognition for his work. Surviving him are his widow, two daughters and two sons.

Dr. C. Milton Stratton, dean of the medical fraternity in Napanee and Lennox and Addington County, died in Kingston General Hospital, November 19, following a long illness. He was a graduate of Queen's University in 1902.

He had been a member of the county council for about 12 years until resigning as reeve of Napanee at the end of the 1944 term owing to failing health.

Practising in the town and district for over 40 years he was the Medical Health Officer for Richmond Township and during the first Great War examined a large number of recruits enlisting for active service. He was a staunch Conservative, a Masonic past master and a member of Grace United Church. His widow survives.

Dr. Charles Fenwick Wylde died in Montreal on November 24, in his 80th year.

A native of Halifax, Dr. Wylde received his early education there and entered McGill University, from which he graduated in medicine in 1888 before he had attained his 21st birthday. After practising elsewhere, including some years at Westville, N.S., he returned to Montreal in 1895 where he became active in medical, military and sports circles.

He was one of the original officers of No. 5 Canadian Field Ambulance, an extremely efficient militia unit under the late Dr. H. S. Birkett, which volunteered and was ready for active service within a day or two of the outbreak of war in 1914. Dr. Wylde went overseas in 1914, his ambulance becoming absorbed into No. 1 Canadian General Hospital with which unit he had a long and distinguished service, eventually being appointed its commanding officer. It was under him that the unit reached its fullest expansion and carried on the tremendous volume of work for which it became so well-known. Later on Dr. Wylde became A.D.M.S. in London and was awarded the C.B. for his outstanding services. He was extremely popular with his men, as he never spared himself in their interests, and his quiet and direct manner inspired confidence and respect. He had the keenest interest in sport, and himself excelled in tennis, golf and curling. He was also an ardent yachtsman and sailed his own boat for many years.

His professional interests in Montreal were extremely wide. He was outpatient physician to the Montreal General Hospital for many years and demonstrator in medicine at McGill University, as well as being librarian to its medical library, helping to acquire many valuable additions to its shelves. He volunteered for service in the recent war, and was appointed chairman of the medical board of M.D. No. 4. In our Association Dr. Wylde was for long the chairman of the Committee on Archives.

He leaves a memory of unchanging sweetness of temper and courtesy. He enjoyed life but gave freely of his time and effort in which his sterling qualities of honesty and simplicity were always immediately apparent. His widow and daughter survive.

NEWS ITEMS

Alberta

At a meeting of the Economics Committee, Canadian Medical Association, Alberta Division, it was proposed that a survey be made of the Province, of the present forms of prepaid medicine in existence. It was felt that the profession should give serious consideration to the matter of prepaid medicine, and be prepared to assist the C.M.A. in the providing of a plan which, in principle, could be accepted throughout Canada.

The third annual meeting of the Associated Hospitals of Alberta, was held at the Palliser Hotel, Calgary, on November 6, 7 and 8, 1946.

The Association was formed in 1943 by the amalgamation of the Alberta Hospitals Association and the Alberta Municipal Hospitals Association. Ninety of the approved hospitals are members of the Association.

In his presidential address, Dr. A. C. McGugan, Superintendent of the University of Alberta Hospital, spoke of the courteous and sympathetic reception the Association had received from the Minister of Health and officials of the Health Department in all registrations during the past year. He paid particular tribute to the work of the Economics Committee which he believed would result in increasing the annual income of hospitals in the Province by \$380,000. This Committee, among other things, had arranged for a fifty cent daily increase in maternity rates for hospitals. At the general meeting, resolutions were discussed on means of alleviating the present shortage of trained nurses, as both the city and country hospitals were finding it difficult to obtain full graduate staffs. It was suggested that the Department of Health be asked to arrange for the training of nurses' aides in view of the shortage of nurses. The Economics Committee was asked to enter into negotiations with the Provincial Cancer Diagnostic Clinic for increased operating room rates to be paid by the Clinic and with the Workmen's Compensation Board for a revision of rates for auxiliary services, particularly operating room service.

G. E. LEARMONTH

British Columbia

Dr. Harvey Agnew, Secretary of the Canadian Hospital Council, was a recent visitor to Vancouver. While in Vancouver, Dr. Agnew addressed meetings of the B.C. Catholic Hospital Conference, the B.C. Hospitals' Association, and the Registered Nurses' Association of British Columbia.

Dr. Ethlyn Trapp, President of the British Columbia Medical Association, is a visitor in Havana where she is to be one of the speakers at the Inter-American Congress of Radiologists.

A medical staff has been organized recently at the Royal Columbian Hospital in New Westminster. Officers of the new staff are: *President*—Dr. H. H. McKenzie; *Vice-president*—Dr. Geo. T. Wilson; *Secretary-Treasurer*—Dr. W. Brewster; *Executive*—Dr. W. A. Clarke; Dr. B. Cannon; Dr. J. Margulius.

The Annual Dinner of the Vancouver Medical Association was held in the Hotel Vancouver on November 28, 1946. The record attendance reflected the growing number of doctors in Vancouver. The entertainment, which has always been a feature of these dinners, was of high order and the entire affair was judged a great success.

Dr. J. F. Haszard, Chief Medical Officer of the Workmen's Compensation Board, was honoured by the Czechoslovakian Government recently. He was invested at Ottawa with the Order of the White Lion of Czechoslovakia, awarded for distinguished services performed while Commanding Officer of 16 Canadian General Hospital, R.C.A.M.C. in North-West Europe.

Dr. Lavell Leeson and Dr. Roy Huggard attended the Ottawa meeting of the Defence Medical Association held in October, as representatives from the British Columbia Division of the Association.

M. R. CAVERHILL

Manitoba

Plans forwarded by the Manitoba Government to establish a diagnostic centre at Dauphin have been approved by the rural municipalities of Dauphin, Ochre River and Ethelbert. The plan will mean free x-ray or diagnostic service for any resident in the areas mentioned with the province bearing 33 cents and the municipalities 17 cents of the estimated cost of 50 cents per person. Most of the equipment for the service is already available. Two more doctors will be required to complete the staff. Dr. R. M. Creighton of the Dauphin Health unit says the plan will be put into effect as soon as possible.

Dr. Noel R. Rawson, after spending some years as medical officer of the Eskimos, has resumed his position with the Department of Health and Public Welfare. For his services in the north Dr. Rawson was recently awarded the O.B.E.

The Manitoba Hospital Association marked its 25th anniversary by opening on October 28 a five-day institute for hospital administrators at the Royal Alexandra Hotel, Winnipeg. Dr. O. C. Trainor, president of the association and Mayor Garnet Coulter welcomed 120 men and women. Dr. Malcolm T. MacEachern, Chicago, professor of hospital administration and Dr. Harvey Agnew, Toronto, secretary of the Canadian Hospital Council are taking part in the institute.

On October 22, St. Boniface Hospital celebrated the 75th anniversary of its founding.

Dr. H. S. Evans, Brandon, was made a Fellow of the Royal College of Surgeons of Canada at the 16th annual meeting of the College at Ottawa, November 15 and 16. Other Manitoba Fellows present were: Drs. A. T. Mathers, Lennox G. Bell, G. L. Adamson, M. R. MacCharles, J. D. Adamson and Ross Mitchell.

The first Institute for Hospital Administrators and Trustees, arranged by the Manitoba Hospital Association, was held in the Royal Alexandra Hotel, Winnipeg, October 28 to November 2. The Director-in-chief was Dr. Malcolm T. MacEachern, Chicago, Associate Director American College of Surgeons and Professor of Hospital Administration Northwestern University, and assisting him was Dr. Harvey Agnew, Secretary of the Canadian Hospital Council. The institute was well attended and will probably continue as an annual event.

A meeting of the program committee of the Canadian Medical Association was held on Monday, November 4, at the home of Dr. F. G. McGuinness, President-elect of the Canadian Medical Association.

A meeting of the C.M.A. Advisory Committee to the Department of Veterans' Affairs was held in the Medical Arts Club rooms on November 7.

ROSS MITCHELL

New Brunswick

Dr. G. B. Peat of Saint John was elected president of the Council of the Order of St. John for the province of N.B. on the amalgamation of the St. John Ambulance Brigade and the St. John Ambulance Association. Dr. W. W. White of Saint John was elected Honorary President of the New Council.

Dr. H. D. Reid, retiring superintendent of Lancaster D.V.A. Hospital was honoured by staff members of the Hospital on his departure to assume a full time position in Ottawa with the Department of National Health and Welfare. Dr. Reid came to Saint John in 1928 as quarantine officer. For the past ten years he has combined this office with that of Chief Medical Officer for New Brunswick for the Pension Branch of the department and superintendent of Lancaster Hospital. Dr. Reid's duties especially during the war were very exacting and during his period of administration Lancaster Hospital has increased to its present 500 bed capacity. Dr. Reid has interested himself in many community affairs particularly those relating to the benefit of Service Veterans, Saint John Ambulance Association and Red Cross. His many friends wish him well in his new appointment.

Dr. C. O. MacKay of Saint John has vacated his appointment as Departmental District Medical Officer for "K" District to assume new duties as Superintendent of the D.V.A. Hospital at Lancaster.

Dr. Stephen Clark has been appointed Warden of the Municipality of the City and County of Saint John.

A serious fire in Fredericton destroyed the clinic quarters and offices of Dr. G. E. Chalmers, Dr. Robt. Chalmers, Dr. Ross Wright and Dr. J. F. McInerney.

Dr. Geo. Keddy and Dr. George White of Saint John were presented for their Fellowships in Surgery at the recent meeting of the Royal College of Physicians and Surgeons of Canada at Ottawa.

Dr. W. D. Miller and Dr. Arthur F. McInerney have started practice in Saint John.

Dr. Geo. Skinner of Saint John presented a paper on "Empyema" at the Annual Convocation of the Royal College of Physicians and Surgeons of Canada.

Dr. F. C. Jennings of Saint John has been appointed to the Board of School Trustees to succeed Dr. E. W. Lunney, retired.

Dr. S. Taylor, Member for Barnet in the British Parliament was the special speaker at the November Meeting of the Saint John Medical Society. He gave a most lucid and informative explanation of the Social Security plans provided under new legislation by the Labour Government of Great Britain. Naturally he spent most of his time in discussing the medical setup which promises improvement when hospitals, nurses, dentists, doctors, clinics and health centres are available. Some time will of necessity pass before these various shortages are overcome, because the whole nation is still in the slow process of recovery after the last war.

Dr. H. A. Farris, long a national figure in anti-tuberculosis work, was elected the first Honorary President of the New Brunswick Tuberculosis Association at the November meeting of the Association in Fredericton.

The new appointments for 1947 to the staff of the Saint John General Hospital show Dr. C. L. Emerson as chief of Surgical Staff, in place of Dr. A. E. Macaulay, retired. Dr. Geo. Skinner is advanced in rank to senior surgeon. Dr. A. D. Gibbon was appointed senior Pædiatrician. Dr. Norman S. Skianer is now

chief of the Electrocardiograph Department, vice Dr. H. A. Farris, retired. New appointments include: Indoor Medicine—Dr. H. B. Parlee, Dr. Henrik Tønning, Dr. F. K. Stuart and Dr. A. J. McInerney. Surgery—Dr. V. Sadovsky; Out Door Urology—Dr. L. R. Morse; Electrocardiography—Dr. A. L. Donovan and Dr. A. D. Gibbon; Out Door Medicine—Dr. F. H. George, Dr. V. M. Zed and Dr. W. D. Miller. A. S. KIRKLAND

Nova Scotia

Damages to the amount, it is reported, of \$30,000 will be claimed by Mrs. Mary Katherine Bugden in an action against Harbour View Hospital, Sydney Mines and Dr. W. T. McKeough of the same place. Also named as defendants are two nurses attached to the hospital. It is alleged that death of the claimant's husband arose from the injection of adrenalin rather than novocaine while he was under treatment in hospital for an injured thumb. The case will be heard at the January term of the Supreme Court in Sydney. As several legal principles are involved of much interest to hospitals and doctors, its progress will be followed closely.

The City of Sydney has just emerged from a severe epidemic of measles. Press reports indicate that there were over one thousand cases. This is regarded as a cyclic year for measles in Nova Scotia.

Halifax has opened a large new addition to its Tuberculosis Hospital which will give much needed accommodation. The problem of securing an adequate nursing staff is a difficult one for the Superintendent, Dr. C. J. Beckwith. Extensive tuberculosis surveys are planned in the immediate future beginning with the school population of the city.

On December 5 a complimentary dinner was tendered by the Faculty of Medicine of Dalhousie University and the visiting staff of the Victoria General Hospital to four members of both groups who have retired during the year. They are Dr. M. J. Carney of the Hospital Medical Staff and Professor of Pædiatrics; Dr. A. E. Doull, head of the eye, ear, nose and throat department of both institutions; Dr. H. K. MacDonald, head of the department of surgery in both institutions; and Dr. Walter L. Muir, senior anaesthetist, Victoria General Hospital and Assistant Professor of the same at the University. All of these men have given long service of the highest character, are equally honoured and admired by their confrères and friends in Nova Scotia and farther afield.

H. L. SCAMMELL

Ontario

The close of the war made possible the implementing of plans for the further development of the medical research work of the Connaught Laboratories. In April, last, the words "Medical Research" were included in the name of the Laboratories which now are known as the Connaught Medical Research Laboratories.

Since 1914 the Laboratories have prepared and distributed public health biological products, and subsequently, through the preparation of insulin, liver extracts, penicillin and other essential therapeutic agents, additional public service has been rendered. The Laboratories were established for research in preventive medicine and related fields. At present more than fifty research studies are being conducted. The new name involves no change in the organization or activities of the Laboratories. Their services in supplying the essential biological and related products will be carried on as usual.

All the insulin made in Canada has been prepared at these Laboratories. Recently the price has been doubled in the United States, but there has been no increase in the price of insulin in Canada.

Dr. Herbert M. Coleman of Toronto, has announced the opening of an office for the practice of orthopaedic surgery. He graduated from the University of Toronto in 1934, then spent a year as an intern in rotating service at the Toronto General Hospital, one year in Anatomy and Physiology at the University of Toronto, and seven months in practice. He then took postgraduate work at the Prince of Wales Hospital and St. Mary's East End Hospital, London, England, and a course at the Infirmary, Edinburgh, before getting his F.R.C.S. (Edinburgh). In 1939 he returned to Canada to join the R.C.A.F. He was sent overseas and was stationed at Halton and Weeton with the R.A.F. Orthopaedic Service under the direction of Dr. Watson Jones. He is now on the consultant staff of Christie Street Hospital.

The secretaries of the fifty-one branch societies of the Ontario Medical Association are holding a one-day conference at the Royal York Hotel, Toronto, on January 8, 1947. There will be round table discussions on economic problems and on postgraduate education. Dr. William Magner, President of the Association, will preside at the meeting.

Dr. B. C. P. Jansen, Professor of Physiological Chemistry, University of Amsterdam, and Director of the Netherlands Institute of Nutrition, addressed the Physiological Society of the University of Toronto, in November on "The nutritive value of butter, with particular reference to Vaccenic acid". This acid appears to be the growth promoting substance in butter. Dr. Jansen is doing research this winter at the Banting and Best Research Institute.

Dr. Marion Ross has been appointed bacteriologist to Christie Street Hospital. She studied at the School of Hygiene and Tropical Medicine, London for a year before the war, then worked with the Medical Research Council and Ministry of Health until she was permitted to join the R.C.A.M.C. in 1942. She had service in North Africa, Italy and England, retiring with the rank of Lieut.-Colonel.

The Federation of Medical Women of Canada.—At the annual meeting, these officers were elected: Honorary President, Dr. Ellen Douglass, Winnipeg; President, Dr. Margaret Owens, Winnipeg; Vice-presidents: British Columbia, Dr. Isabel Day, Vancouver; Alberta, Dr. Margaret Chase Collins, Edmonton; Saskatchewan, Dr. Anna Nicholson, Saskatoon; Ontario, Dr. Phyllis Bradshaw, Windsor; Quebec, Dr. Eleanor McKenzie, Montreal; New Brunswick, Dr. Alice Brown, Saint John; Nova Scotia, Dr. Margaret Gosse, Halifax; Councillors, Dr. Jessie Sriver, Montreal, and Dr. Florence Murray, Halifax; Acting Secretary, Dr. Mary Eddis, Toronto; Treasurer, Dr. Agnes Moffat, Peterborough; Committee Conveners: Scholarship Fund, Dr. Marion Hilliard, Toronto; Overseas Aid, Dr. Edna Guest, Toronto; Cancer Research, Dr. Lola McLatchie, Calgary; Opportunities for Medical Women, Dr. Jessie Gray, Toronto; Archives, Dr. Mary Eddis, Toronto.

Reports show that of 600 medical women in Canada, 178 are members of the Canadian Medical Association. During the war, 100 were on active service, of these seven served in the Royal Canadian Naval Volunteer Reserve, 79 in the Royal Canadian Army Medical Corps, and 14 in the Royal Canadian Air Force. Squadron Officer Jean Davey received the O.B.E.; Lieutenant-Colonel Marion Ross was the ranking officer, both are of Toronto.

Dr. Edna Guest of Toronto, Convener of the War Services Committee, has been made an honorary member of the British Federation of Medical Women. The Canadian Federation has been contributing since 1941 to British women physicians who have been victims of bombing in the United Kingdom. At the present the contributions are going to an English woman medical student who has suffered through

bombings; she will graduate in 1948. Gifts from Canadian women will continue until after her graduation. It is hoped that she will then be able to come to Canada for an intern year.

The International Association of Medical Women has now revived after the war. The Council is made up of representatives of every country in the world where women physicians are organized. The next Congress meeting will be in Holland in 1947 during the summer.

On October 28, 1946, the Physiological Society of the University of Toronto was privileged to have as its guest speaker Sir Henry Dale, Past President of the Royal Society of London. He discussed the chemical transmission of nerve impulses, a field in which the speaker himself was a pioneer and outstanding investigator.

Starting with the work of Elliott and of Loewi he traced the growth of the ideas concerning the chemical transmission of nerve impulses. He dealt with the evidence for acetylcholine as the transmitter substance for sympathetic ganglia, postganglionic parasympathetic fibres and motor nerves. The rôle of acetylcholine in synaptic transmission in the central nervous system was discussed and a word of caution introduced concerning the acceptance of acetylcholine as the central mediator for dorsal root fibres. Sir Henry's lucid exposition and his reminiscences made the talk most interesting and memorable.

Dr. H. A. Beatty of Toronto retired this year from his position as Chief Surgeon and Medical Officer for the Canadian Pacific Railway System. In November he was tendered a farewell reception and banquet by officials of the company in the Royal York Hotel. The affair was attended by his successor Major General C. P. Fenwick, officials from the head office of the railway, express company, railway brotherhoods and members of Dr. Beatty's former staff.

Dr. Beatty is still in consulting practice but devotes considerable time to his hobby which is a farm not far from Toronto.

On November 20, a meeting was held in Owen Sound for the purpose of re-establishing the Grey County Medical Society, and Dr. Douglas Taylor spoke on "Recent advances in the treatment of rheumatic conditions". Dr. A. D. Kelly, Executive Secretary of the Ontario Medical Association was the after-dinner speaker on the subject of "Prepaid medical care".

LILLIAN A. CHASE

Prince Edward Island

The Province has had an infantile paralysis (polio-myelitis) epidemic that made its appearance first in the spring months and after sporadic cases showing up during the early summer, flared up in August and September, and now with the cold weather is gradually petering out. Ninety-four cases have been reported, with fourteen deaths, almost all of which occurred in adults. To date the cases have been treated in the homes and the various hospitals.

The Provincial Department of Health are now in the process of opening a wing in the Sanatorium to care for the cases with residual paralysis. The organization of this work has been put in the hands of the Provincial Sanatorium Commission and is being directed by Dr. P. A. Creelman. Arrangements have been made to have Dr. T. B. Acker, of Halifax, and Dr. R. F. Seaman, of Charlottetown, supervise this work. Dr. Acker has made two visits to the Province and has examined fifty cases with paralysis. An additional twenty-five cases have been reported with paralysis, and are now in the process of assessment. It is hoped to be able to collect together in this polio clinic all the cases requiring therapy.

The final dinner meeting of the year was held in the Charlottetown Hotel on October 20, with thirty-two members present. Dr. T. B. Acker, of Halifax, was present, and spoke on "Poliomyelitis". In view of the prevailing epidemic, Dr. Acker's address was very timely, and very helpful.

Quebec

Notre confrère l'*Union Médicale* fit paraître en novembre dernier un numéro spécial de plus de 400 pages à l'occasion du 75ième anniversaire de sa fondation. Ce numéro résume admirablement la vie médicale de tout un siècle et intéressera tous les médecins du Canada. Il faut féliciter les rédacteurs de ce journal pour leur belle présentation.

Le Dr L. C. Simard a été élu président de l'Association canadienne-française pour l'avancement des sciences.

Le Dr G. Gosselin a été nommé directeur médical de l'Hôtel-Dieu de Montréal.

Le Dr R. Desmeules de Québec a été élu président de l'Association canadienne antituberculeuse.

On vient d'annoncer la fondation prochaine à Montréal d'un Institut d'orthopédie. L'Institut sera érigé au coin du boulevard Décarie et de la Côte St-Luc, à l'emplacement même de l'ancien hôpital des Incurables. La construction de cet immeuble coûtera deux millions de dollars.

JEAN SAUCIER

Saskatchewan

The appointment of Dr. Donald Griffith McKerracher, of Toronto, as Provincial Psychiatrist and Commissioner of Mental Services was announced by Premier T. C. Douglas, Minister of Health, recently. Dr. McKerracher comes to Saskatchewan following considerable service with the Ontario Department of Public Health.

General

Author's Reprints.—For the information of those contributing articles to the *Journal* it is announced that recent rising costs of printing have made it necessary to advance the price of reprints. New reprint forms will be sent with proofs, showing the increase; in the case of a paper of 4 *Journal* pages the rate now will be \$4.40 plus tax as against the previous rate of \$3.50 plus tax. Correspondingly higher rates will apply on longer papers.

In future, reprints will be the full *Journal* page size instead of being in the smaller form hitherto used. If an author wishes the smaller size reprint it can be arranged, on his request, but the cost of these will be greater than the full *Journal* page size by about 28%.

An Order in Council of October 8, 1946, directs that: Mercuric Chloride tablets for household use, packaged in lots of 200 or less, shall be of an angular or irregular shape, blue in colour and packed in special containers, which containers shall be readily distinguishable by touch and shall bear on the label thereof in prominent type and in a colour contrasting to the label the design of a skull and cross-bones and the word "poison".

The Francis Amory Septennial Prize of the American Academy of Arts and Sciences.—In compliance with the terms of a gift under the will of the late Francis Amory of Beverly, Mass., the American Academy of Arts and Sciences offers a substantial prize for out-

standing work addressed to the alleviation or cure of diseases affecting human reproductive organs. The gift provides a fund, the income of which may be awarded at seven-year intervals "as a prize and gold medal, or other token of honour or merit", to any individual or individuals for work of "extraordinary or exceptional merit" in this field.

No formal applications and no essays or treatises from individuals are solicited but suggestions will be welcome from any appropriate source that will be of aid to the Committee in making a wise selection. Recommendations may be addressed to Secretary, Amory Fund Committee, American Academy of Arts and Sciences, 28 Newbury Street, Boston, Mass.

The George Washington University, Department of Ophthalmology, is planning the resumption of the Wm. Thornwall Davis intensive postgraduate course in ophthalmology, February 3 to 8, 1947.

The 10th annual postgraduate course in ocular surgery, pathology and orthoptics will be given during the week of January 27 to February 1, 1947. The Army Institute of Pathology will give the instruction in pathology under the direction of Colonel J. E. Ash, Medical Corps, U.S.A., Scientific Director of the American Registry of Pathology National Research Council. The surgery demonstrations will be given by the resident staff under the direction of Dr. Ernest Sheppard, Professor of Ophthalmology. This is a practical course with demonstrations on animal eyes. For further details write to the Secretary, Suite 34, 1801 K Street, N.W. Washington 6, D.C.

Postgraduate Course of Urological Instruction at St. Peter's and St. Paul's Hospitals, London, W.C. 2, January to April, 1947.

The course will include some forty systematic lectures covering the whole subject of Urology, out-patient sessions, ward visits, operation sessions and tutorial demonstrations.

All postgraduates attending the course will be expected to be present at lectures, and may attend all the tutorial demonstrations. They will be allotted individually to certain out-patient sessions, ward visits and operation sessions. The fee for this three months' course is fifteen guineas payable in advance. Applications should be made to: The Secretary, St. Peter's Hospital for Stone, Henrietta Street, London, W.C. 2, England.

This will be followed by a six months' course commencing in April, 1947.

Urology Award.—The American Urological Association offers an annual reward "not to exceed \$500" for an essay (or essays) on the result of some clinical or laboratory research in Urology. Competition shall be limited to urologists who have been in such specific practice for not more than five years and to residents in urology in recognized hospitals.

For full particulars write the Secretary, Dr. Thomas D. Moore, 899 Madison Avenue, Memphis, Tennessee. Essays must be in his hands before May 1, 1947.

1946 Canada Year Book.—The Canada Year Book for 1946 is now available for distribution by the Dominion Bureau of Statistics. It will be supplied at the price of \$2.00 per copy, which no more than covers the cost of production. Paper bound copies at \$1.00 each are available for teachers, university students and ministers of religion. Full attention is given in this edition to post war problems; there are also articles on Navigation; the Air Training Plan; National Defence; agriculture; and mineral industry. The Report of the Royal Commission on Co-operatives is also included. The book is packed with authoritative material of the greatest variety.

BOOK REVIEWS

Diagnosis of Nervous Diseases. J. Purves-Stewart, Knight of St. John of Jerusalem, Consulting Physician to Westminster Hospital. 880 pp., illust., 9th ed. Edward Arnold & Co., London, 1945.

This is the ninth edition of a textbook first published by the author as far back as 1906—and this fact alone gives some indication of its continuing value to students of neurology, and is a tribute to the vigour of its author. It is essentially a textbook of diagnosis (as the title indicates), and not a systematic textbook of neurology. Neurological symptoms rather than disease entities, are considered chapter by chapter; for example, delirium, coma, convulsions, pain, paralysis, inco-ordination and so on. Under the heading of each symptom, differential diagnosis is discussed, illustrated by cases from the author's own experience. This is a sound practical approach for clinical teaching.

The two introductory chapters on Physiological Anatomy review in general terms the applied anatomy and physiology of the nervous system. They are up to date in some respects but disappointing on the whole. One can point out a number of errors and omissions of modern work. For example, newer work on the anatomy of the thalamus by LeGros-Clark, Walker and others, has escaped mention and most anatomists would quarrel with his diagram of the central trigeminal pathways. It is surprising to find the statement made (in a discussion of spinal fluid pathways) that there is a direct connection between the temporal horn of the lateral ventricle and the cisterna basalis by a slit-like foramen.

Undoubtedly the best chapters are the descriptive clinical chapters, and they have remained with the least alteration in new editions. It would be hard to find their equal in any other neurological text of the present day.

Medical Jurisprudence. W. F. Rhodes, Government Pathologist, Union Health Department, Cape Town; I. Gordon, Sr. Assistant Government Pathologist, Union Health Department, Cape Town; and R. Turner, Specialist Serologist, Union Health Department, Cape Town. 512 pp., illust., 2nd ed. 32/6. The Stewart Printing Co. (Pty.) Ltd., Cape Town, 1945.

This is a most valuable single volume of work on the subject of Medical Jurisprudence. While Chapters 1, 2, 3, 21, 22 and 23 deal with their subjects from the point of view of the South African legislation and hence are not applicable in Canada, the remaining 17 Chapters deal with the various aspects of medico-legal science in a thorough, comprehensive and up to date manner. The volume is particularly useful to medical libraries and to the libraries of those engaged in medico-legal work from the pathological and laboratory angle.

Diseases of the Retina. H. Elwyn, Senior Assistant Surgeon, New York Eye and Ear Infirmary. 587 pp., illust. \$10.00. The Blakiston Company, Philadelphia and Toronto, 1946.

This is a good book. A thousand men will recognize the fundus picture: a hundred will describe it well, in words: but only a few will dig into the "ultimate why" of it, and reasonably explain its being. This author has done all three of these: but it is especially this last, which makes the book so thought-provoking, so worth-while.

The section on vascular changes is especially good: the general observations on vascular disease, high blood pressure, nephritis, and diabetes are very valuable. Retinal disease associated with these general disturbances, makes up so large a part of our fundus

work, that it is just here we need the stimulus to honest, broader, deeper thinking.

That part given to heredo-degenerative diseases, will not appeal so much; but only because they are relatively rare. The broad, thoughtful background in these studies, is the same as in the preceding ones.

The chapters on commotio retinae, on idiopathic detachment, and on the effects of strong light, show the same seeking for ultimate cause. Indeed the whole work is unique, in that it is forever taking one back-stage. He is a strange man whose interest in these problems will not be deepened, and whose outlook will not be broadened, by the thoughtful reading of this book.

The publisher has made an attractive volume: a good size; good print, and good illustrations.

Medical Services by Government Local, State and Federal. Bernhard J. Stern, Lecturer in Sociology, Columbia University. 208 pp. \$1.50. The Commonwealth Fund, 41 East 57th, New York, N.Y., 1946.

In 1942 the New York Academy of Medicine formed a Committee on Medicine and the Changing Order. This relatively small book is one of several or more monographs which will comprise the report of that Committee. A definite outline with essential details is presented as to the extent and manner in which local, state and federal public funds are at the present time in the United States granted to the care of the sick at home, in the physician's office, in hospitals and other institutions, and in various types of public health clinics. During the past two hundred years the extent and scope of Government grants for the care of the sick has increased. This increased support of diagnostic and treatment services has accompanied a greater public interest in social legislation. There has been a trend in public thinking toward the goal of so-called social security.

The growth of large scale industrial employment and consequent development of large urban centres has made the care of the sick less of a small local problem, and more one for larger administrative direction. These points are all clearly dealt with.

Men Without Guns. Text by DeWitt Mackenzie, War Analyst of the Associated Press; Descriptive Captions by Major Clarence Worden, Medical Department of the United States Army; Foreword by Major General Norman T. Kirk, Surgeon General of the United States Army. 151 pp., illust. \$6.50. The Blakiston Company, Philadelphia and Toronto, 1945.

This book is an amazing pictorial record of the work of the American Army Medical Corps. Twelve outstanding artists were assigned to various theatres of war to record their impressions of the medical care given soldiers under battle conditions. The training of medical corpsmen and nurses and the rehabilitation of the wounded servicemen all find a place in this artistically arranged selection of watercolours and sketches.

Of most dramatic interest are the pictures of the five artists who accompanied frontline combat troops—Franklin Boggs in the Southwest Pacific; Robert Benny at Saipan; Joseph Hirsch to Italy; Lawrence Beall Smith in Normandy; and Howard Baer on the Burma Road. Preceding this gallery of grim heroism is an account by each artist of battle conditions in the theatre to which he was assigned, and the remarkable problems and achievements of the medical personnel.

It is difficult and perhaps unwise to attempt special comment on these authentic war pictures. The eerie quality conveyed by Baer's jungle pictures is remarkable. There is stark reality in Benny's "Shock Tent" where he notes "the great thrill of seeing these men brought back to life as the blood from fellow Americans thousands of miles away slowly drips into their veins is a sight never to be forgotten".

"Men Without Guns" is a book for one's library. There could hardly be a more graphic representation of the suffering of war and the remarkable capacity and endurance with which men face it.

Insight and Personality Adjustment. T. Benedek, Institute for Psychoanalysis, Chicago. 307 pp. \$4.00. The Ronald Press Company, New York, 1946.

This study of the stresses and strains which fell on all of us as a result of the war is a valuable addition to the growing literature of rehabilitation. Dr. Benedek applies the concepts of Freud and his followers in describing and explaining the psychodynamics of the various situations which soldiers and civilians were called upon to meet. It is a study, not of the psychiatric casualties caused by war but of the reactions of the whole population to the abnormal war situation: a situation which none escaped and to which all, in varying degrees, showed some tendencies in thought and behaviour which were, to a degree, abnormal. The author is interested especially in the problem of the returning veterans of both sexes and in the difficulties which have to be faced when the soldier resumes his civilian life.

The rôle of predisposition to neurosis was appreciated by everyone who had to do with psychiatric problems in the services; Dr. Benedek emphasizes that the reaction of the individual to army life or to separation caused by the service of husband, son, or fiancée, was to a great extent determined by the pre-existing conflicts and traits of the personalities concerned. Emotional insecurity due to separation and to immaturity was more frequently the cause of neurosis than was hardship or danger due to the conditions of army service.

The cultural implications of disruption of family relationships are ably discussed, and this book should be of interest to sociologists and welfare workers as well as to physicians. At times, the author is perhaps too serious in estimating the gravity of the reactions she describes. Non-Freudians may be irritated by the wholehearted acceptance of analytic psychopathological concepts as an adequate explanation of neurotic tendencies. But Freudian or no, the reader should find this work an interesting and important study.

Practical Handbook of the Pathology of the Skin. J. M. H. MacLeod, Physician and Hon. Director of the Pathological Department, St. John's Hospital for Diseases of the Skin; and I. Muende, Physician with charge of Pathological Department and Lecturer at St. John's Hospital for Diseases of the Skin. 435 pp., illust., 3rd ed. 50s. H. K. Lewis & Co. Ltd., London, 1946.

In the preface to the original volume, the authors indicated clearly the object and limitations of this book. It is a practical handbook, an introduction to the subject, intended primarily for the student in dermatology and is not a complete treatise on the pathology of the skin. For this the student is referred to the large treatises on the subject of which there are many.

A considerable part of the book is taken up with the embryology and normal histology of the skin, as a knowledge of these is essential to an appreciation of the pathological changes that occur.

The first six chapters are devoted to the obtaining of biopsy material, its preservation and proper imbedding, and in some detail the staining of the material. The various stains and their method of action are discussed. Six chapters are devoted to a study of the epidermis, beginning with normal histology and embryology and then proceeding to the pathological and congenital changes. The corium, hair, glands, vessels, etc., are treated similarly. Chapters are devoted to the pigment and nails as well.

Among the best chapters are those devoted to the parasitic diseases of the skin, the bacteria, and the dermatophytes. The technique for determining their presence is minutely and clearly described. The profuse use of many excellent illustrations is of distinct value.

This book is recommended as a must for the student and is well worth the perusal of the teacher in dermatology.

Practical Chemistry for Medical Students. W. Klyne, Lecturer in Biochemistry, University of Edinburgh. 660 pp., illust. \$4.50. E. & S. Livingstone Ltd., Edinburgh; Macmillan Company of Canada, Toronto, 1946.

This textbook covers the practical work done by medical students in the pre-registration and first year chemistry courses at the University of Edinburgh. The arrangement of the book is somewhat novel: it is divided into five parts, dealing with Physical Chemistry, Inorganic Chemistry, and Organic Chemistry. In addition there are two introductory sections devoted to Fundamental Scientific Ideas and Practical Methods. All students using the book at Edinburgh are definitely committed to the study of medicine or dentistry, and the whole presentation is orientated to fill their needs. The result is a concise work which covers a large area of science in a very efficient way.

The first part dealing with the nature of scientific work is a very valuable section: it points out the logic and limitations of the experimental method, and if its contents were adequately grasped it should save the student from much confusion at a later stage in his studies. The fundamental principles of general chemistry are lucidly presented; enough theory is included to explain the rationale of the various experiments described, and for the junior student little in the way of a supplemental textbook should be needed. The section on inorganic chemistry gives the chief chemical properties of the various elements, together with their ionic reactions and medical uses. There is also a fairly complete scheme of analysis for the identification of simple inorganic substances. The section on organic chemistry obviously does not pretend to be complete, but the chief compounds of biological importance are dealt with briefly. In Canada the ground covered is customarily spread over several years of study: in some instances the book may be found inadequate. However, it is a clear and lucid presentation of the basic chemical knowledge which every student must have before embarking on the study of biochemistry. It will be used gratefully by many students as an ancillary source of information; it might well be recommended by those teaching chemistry to pre-medical students, and could be read with profit by many in a more advanced stage of their careers.

Actions of Radiations on Living Cells. D. E. Lea, Prohit Student of the Royal College of Surgeons, Formerly Fellow of Trinity College, Cambridge. 402 pp., illust. \$6.25 (21s.). Cambridge University Press, London; Macmillan Company of Canada Ltd., Toronto, 1946.

This volume is based on work done at the Strangeways Laboratory, Cambridge, during the past decade. It gives an extended discussion of the effects of x-rays and other ionizing radiations on plant and animal cells. The treatment involves a great deal of mathematical analysis, but apart from the mathematics the book contains a fairly complete discussion of the various theories invoked to explain the effects of radiation. Since the most important effect of radiation of whatever sort is probably mediated by virtue of energy changes, it is impossible to treat the subject completely without the use of advanced mathematics. The book should be of outstanding value to research workers in this field, and should interest those radiologists concerned with the more theoretical aspects of their subject.

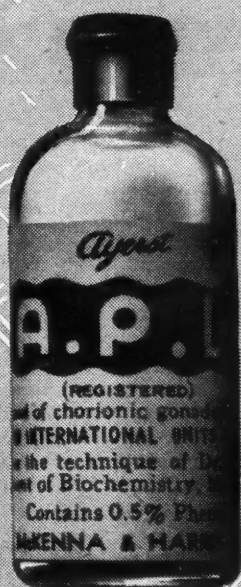
Clinical Handbook for Residents, Nurses and Students. V. M. Coppleson. 469 pp., illust., 3rd ed. 25s. Angus & Robertson Ltd., Sydney, London, 1946.

This book is a very practical guide to clinical surgery and operative procedures, and is now in its third edition, with much valuable additional information about such

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matters as the management of urological cases, plastic surgery, water balance, orthopaedic nursing, administration of fluids and a comprehensive discussion of penicillin and sulfonamides. Postoperative care is brought up to date, as well as the management of casualties. The book is one for practical use on the ward, for doctors and nurses. In fact, one copy has found its way into a surgical ward in a large general hospital, and is in active use by housemen and nurses in the day-by-day routine of the ward. The book does not talk down to students, but the terminology and text is concise and avoids technicality.

Conference on Diagnosis in Sterility. Edited by E. T. Engle. 237 pp., illust. \$5.00. Charles C. Thomas, Illinois, 1946.

Sponsored by the National Committee on Maternal Health a conference on diagnosis in sterility was held in January, 1945, at New York City. The proceedings of this conference, edited by Earl T. Engle, Chairman, Committee on Research, National Committee on Maternal Health, appear in the book under review. The members who participated were distinguished gynaecologists, urologists, internists and pathologists of the United States. The subjects discussed are not all of equal value, but the presentations have the merit of coming from men each of whom has made a special study of his subject. Particular praise must be given to Arthur T. Hertig whose remarks on diagnosing the endometrial biopsy are illustrated with beautiful microphotographs. The summary by John Rock is full of common sense. As to the format, it is all that one expects in a Charles C. Thomas book.

Increasing attention is being paid not only by the medical profession, but by the public generally, to the subject of infertility. Those who are interested will find this report a valuable reference work.

Diseases of the Adrenals. L. J. Soffer, Adjunct Attending Physician, the Mount Sinai Hospital, New York City. 304 pp., illust. \$6.30. Lea & Febiger, Philadelphia; Macmillan Company of Canada, Toronto, 1946.

This book is a thorough and concise review of the present day knowledge pertaining to the adrenals in health and disease. The review of the anatomy and physiology of the gland is short, but sufficient to refresh the practitioner's memory so that he can understand the changes which take place in the diseased organ. In it is contained a review of much of the experimental and research work that has been done by others, as well as original work and observations by the author. There is still a great deal to be learned about the adrenals and their relation to other ductless glands, both in health and disease. This book, as did Dr. Addison's original work, presents a challenge to scientists to uncover still more facts pertaining to the gland.

Any one interested in ductless glands, and this should include all clinicians, will find this book of value. The differential diagnosis is clearly stated and the technique of many tests is given in detail.

Food and Nutrition. E. W. H. Cruickshank, Regius Professor of Physiology in the University of Aberdeen. 326 pp., illust. \$3.75. E. & S. Livingstone, Ltd., Edinburgh; Macmillan Company of Canada, Toronto, 1946.

Dr. Cruickshank has apparently written this book for medical practitioners, medical students and for those of the general public who are already fairly well-informed on the subject. Most of it is easy reading and considerable historical detail is given. Numerous tables showing the nutrients present in various foods are included. In the table showing protein requirements, it is surprising to note that a very active man is said to require 70% more protein than a sedentary man. The

allowances recommended by the National Research Council (U.S.A.) do not vary with the activity of the individual. The chapters dealing with wartime rationing and bread in Great Britain and with F.A.O. are useful summaries on these subjects. One regrets that some topics are dealt with very briefly, whereas others, such as the dehydration and preservation of foods, are needlessly detailed.

Hermaphroditos, the Human Intersex. A. P. Cawadias, Physician, St. John Clinic and Institute of Physical Medicine. 81 pp., illust., 2nd ed. 15s. William Heinemann Medical Books Ltd., London, 1946.

The author in this excellent monograph discusses the physiology of sex formation, intersexuality, virilism, feminism and male and female hermaphroditism. Considerable space is devoted to the author's general conception of intersexuality and the physiology of sex formation. The mild forms of intersexuality which are more common than the rarer forms of pseudo and true hermaphroditism are fully discussed. The true hermaphrodite is considered as a male or female who has attained a high degree of intersexuality. Virilism due to hyperplasia and tumours of the adrenal and arrhenoblastoma of the ovary is concisely presented. Cushing's disease is briefly mentioned and classified as a special form of adrenal virilism. The difficulties of sex determination in hermaphroditism are presented and the importance of treatment aimed to perfect the pragmatic or sex willed by the patient rather than the genetic sex is emphasized. The illustrations, 14 in number, are not original and could be improved. The bibliography is adequate and contains a large number of foreign references.

This book is an excellent one written in a pleasant philosophical style. The reader interested in this field of medicine should find it instructive, thought-provoking and practical.

Jewish Luminaries in Medical History. H. Friedenwald, Professor Emeritus of Ophthalmology, University of Maryland. 199 pp., illust. \$3.00. The Johns Hopkins Press, Baltimore, 1946.

This volume by Dr. Friedenwald, the veteran ophthalmologist, medical historian and scholar of Baltimore is a supplement to his definitive two-volume work *The Jews and Medicine* published in 1944. It comprises an address delivered at Johns Hopkins University in 1943 which is a sketch of Jewish contributions to medicine from ancient Judaic times to Paul Ehrlich, together with a bibliographical catalogue of his own library, the most complete collection yet made of books dealing with the history of Jewish medicine.

The catalogue is divided into two parts—the first dealing with writings of and references to individual physicians, and the second general works of reference bearing on this field. The whole is a labour of love and the work of a devoted, alert scholar and great humanitarian.

Normal Encephalogram. L. M. Davidoff, Professor of Clinical Neurological Surgery in the College of Physicians and Surgeons, Columbia University; and C. G. Dyke, Late Associate Professor of Radiology in the College of Physicians and Surgeons, Columbia University. 232 pp., illust., 2nd ed. \$5.50. Lea & Febiger, Philadelphia; Macmillan Company of Canada, Toronto, 1946.

Due to the untimely death of Dr. Dyke in 1943, the revision of the first edition of this book has been done by Davidoff alone. The first edition was popular. The second should be more so. It is well written and very well illustrated. It follows a logical sequence giving the indications, contraindications, techniques and reactions. The ventricles as seen in the normal encephalogram are described and illustrated. This is followed by the sulci and cisterns that may be seen. Finally the relation of



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1. Heller, C. G., and Myers, G. B.: J.A.M.A. 126:472, 1944.

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intracranial structures to the spaces outlined by air are described.

The techniques used by the authors are good and one feels that it would have been well to separate them more sharply from those described by other authors. This book certainly should be part of the library of anyone interested in doing pneumoencephalography.

Nutrition and Chemical Growth in Childhood. Volume II, Original Data. I. G. Macy, Director of the Research Laboratory, Children's Fund of Michigan. 1460 pp., illust. \$13.50. Charles C. Thomas Publishing Company, Springfield, Illinois; Ryerson Press, Toronto, 1946.

The title of this work suggests immediately the magnitude of such studies. The investigations are concerned with the metabolism of normal children, living under controlled conditions, which approach as closely as possible the environment, habits, nutrition and life in general of an average child.

In this volume the authors have published in detail the results of the various studies which appeared in Volume I. This is entitled "Original Data" and in the opinion of the reviewer it is unquestionably the most extensive work published on this subject. The data thus collected are extremely valuable and will serve as standards of nutrition and growth in childhood. Such data will enable investigators of abnormal conditions to compare their findings with those of normal children, without the necessity of obtaining an enormous amount of control data.

The wealth of information in this type of reference volume adds to the difficulty of the reviewer. The various aspects of growth and development are studied; *e.g.*, anthropometric measurements, dentition, skeletal maturation, nitrogen studies, mineral balances, haematological studies, basal metabolism measurements, height-weight relationships and many other aspects. The rate of development is followed by x-ray examination. This book is such as to appeal to investigators in the problems of nutrition. It is of value to teachers and especially those in paediatrics and biochemistry, and the complete series should be included in the library of every hospital with a paediatric service. The results of these investigations are to be summed up in Volume III. This will be entitled "Interpretation", and its publication will be awaited with interest.

Principles of Neurological Surgery. L. Davis, Professor of Surgery and Chairman of the Division of Surgery, Northwestern University Medical School, Chicago, Ill. 540 pp., illust., 3rd ed. \$7.50. Lea & Febiger, Philadelphia; Macmillan Company of Canada, Toronto, 1946.

In this new edition the author has enlarged the size of his book and has increased the number of its illustrations. The chapters on Cranio-cerebral Injuries, Spinal Cord Injuries and Injuries of the Peripheral Nerves have been expanded as a result of additions to knowledge from war experiences. The book continues to be a valuable and conservative appraisal of the scope of up-to-date neurological surgery.

Penicillin in General Practice. J. L. Hamilton-Paterson, Pathologist to Redhill County Hospital, Edgware. 95 pp., illust. 5/- Staples Press Ltd., Cavendish Place, London, W.1., 1946.

This booklet is offered as a guide for those using penicillin in general practice. There has naturally been much compression but most of the clinically useful knowledge is included and a cautious attitude is held towards those questions which are still in the experimental or speculative stage. There are few diagrams and illustrations but the writing style is clear and easy and the average practitioner should have little difficulty in grasping the meanings. The sections dealing with the history and laboratory investigations are written more convincingly than those on the clinical aspects,

a difference which is probably traceable to the author's training as a pathologist.

The merits of this little book are greater than its market prospects. More elaborate works on penicillin have already appeared and others are in course of preparation. On this side of the Atlantic the pharmaceutical houses are flooding medical offices with brochures, pamphlets and periodicals, many of which are of large size and all of them attractive or alluring. It is perhaps discouraging to suggest that medical authors must now compete with the literary and financial resources of the drug houses but medical literature is one of the commodities on which there is no ceiling—and no floor.

Renal Hypertension. E. Braun-Menendez, J. C. Fasciolo, L. F. Leloir, J. M. Munoz, A. C. Taquini, Institute of Cardiology, V. F. Grego Foundation, Buenos Aires, Argentina, and Institute of Physiology, Faculty of Medical Sciences. Translated by L. Dexter, Harvard Medical School and Peter Bent Brigham Hospital, Boston, Mass. 451 pp., illust. \$6.75. Charles C. Thomas, Illinois, 1946.

The report of Goldblatt in 1934 stimulated anew the study of the part played by the kidney in the production of hypertension. Attacks on the problem were begun in many laboratories not only from different angles but with varying methods and objectives. Reports of these investigations grew multitudinous and as the results were sometimes irreconcilable the state of knowledge became chaotic. To bring order from this chaos the authors of this monograph, who are associates of Professor Houssay and also of established reputation in their own right, undertook to assemble, critically analyze and correlate all the important or relevant writings on the subject of renal hypertension. The gratitude due them can be measured by the magnitude of the task accomplished, for the bibliography they have listed runs almost to 84 pages. To make the way of the indolent easier, every chapter is succinctly summarized.

Although this monograph first appeared in 1943 this is the first edition in English. The translator, Dr. Lewis Dexter of Harvard, wisely chose to give a free rendering, thereby avoiding the stodginess and ambiguity which are found so frequently in literal translations. He was able to do this authoritatively because he was a co-worker in Professor Houssay's laboratory, took part in many of the experiments here recorded and had a first-hand acquaintance with the views of the authors.

Few recent medical publications are so worthy of recommendation. It is at present the most important source of information on renal hypertension and will be indispensable in the laboratory. For the internist and the urologist it is practically a compulsory study. The general practitioner also will find it enlightening and profitable reading. He may be disappointed to learn that his present management of the hypertensive patient has little experimental support, but he will gain the satisfaction which comes from knowing with certainty that his therapeutic ineffectiveness is not unique.

Technical Minutiae of Extended Myomectomy and Ovarian Cystectomy. V. Bonney, Consulting Gynaecological and Obstetric Surgeon to the Middlesex Hospital, London. 282 pp., illust. \$9.00. Cassell & Company, Ltd., London; McAinish & Company, Ltd., Toronto, 1946.

It is well known to pathologists of surgical and gynaecological hospitals that female genital organs are often sacrificed for indications which are comparatively slight. Out of his tremendous experience Mr. Victor Bonney has realized that in many instances, which formerly would have called for hysterectomy and ovariectomy, a part of the uterus or ovary may be conserved without failure of function. This may add immeasurably to the happiness of the patient. Mr. Bonney points out that conservation as an ideal has many well-springs: compassion for another's misfortune, respect of the craftsman for structure and func-

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tion, the artist's reverence for harmony, and the conviction of the plain man that to sacrifice the whole for a part is poor economy.

From an experience of having personally performed myomectomy over 800 times and ovarian cystectomy over 300 times, he sets forth with words and pencil the varied and often intricate methods by which fibroids, even to the extent of 225 from a single uterus, or with co-existing pregnancy, may be removed without sacrificing the whole organ or the fetus. He shows that cysts, even to a weight of 20 lb. or over, may be excised from the ovary and yet ovarian tissue and consequent function retained. Ovarian cystectomy is applicable to all undoubtedly innocent ovarian cysts and solid growths in women under 50 years of age, provided the tumours have not undergone torsion, or become inflamed or markedly adherent.

Hæmostasis in myomectomy is secured by preliminary clamping of the ovarian vessels by ring forceps and of the uterine arteries and the circulation through the cervix, by the author's myomectomy clamp. The ingenious "hood" operation for posterior fibroids, the tunnelling approach to small growths and wedge-shaped excision of the entire thickness of the uterine wall are described in detail. Many of the methods will tax to the full the ingenuity and skill of the operator, but the difficulties are inherent in the magnitude of the task and not from any failure on Mr. Bonney's part to give careful and detailed instruction.

This book should be in the library of every gynaecologist.

Textbook of Pædiatrics. Mitchell-Nelson. Edited by W. E. Nelson, Professor of Pædiatrics, Temple University School of Medicine. With the Collaboration of Forty-Nine Contributors. 1350 pp., illust., 4th ed. revised. \$11.50. W. B. Saunders Company, Philadelphia and London; McAinsh & Company Limited, Toronto, 1945.

In effect the 4th edition of this standard text is a new treatise on Pædiatrics. The authoritative opinion of each of the 49 collaborators has been integrated into a very well balanced summary of the field, in which (proper) brevity of treatment of less common conditions has not detracted from the detail of their description. Furthermore, the skilful editing of Dr. Nelson has maintained a continuity of style which encourages logical study of each subject. In addition to consideration of up-to-date therapeutic measures, this text warrants especial mention for its chapters on The Newborn Infant and The Premature Infant in which attention is continuously focussed on the physiology of this age group.

The subject matter is so completely covered that mention of even the rarest of pædiatric conditions has not been omitted. In this sense the text becomes a very valuable reference book for the practising pædiatrician or physician. On the other hand, the logical diagnosis and therapy render this book of great value to the graduate or undergraduate medical student as a complement to his lectures.

The book cannot be recommended too highly.

BOOKS RECEIVED

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Die Grundlagen Unserer Ernährung und Unseres Stoffwechsels. E. Abderhalden, Professor an der Universität Zürich. 202 pp. Schw. Fr. 8.50. Medizinischer Verlag Hans Huber, Bern, 1946.

Ophthalmology in the War Years. Vol. 1 (1940-1943). Edited by M. Wiener, Professor of Clinical Ophthalmology, Washington University School of Medicine. 1166 pp. \$13.50. The Year Book Publishers, Inc., Chicago, 1946.

Première Journée de Thérapeutique Clinique. 288 pp. Editions Albert Skira, Genève, 1946.

Deuxième Journée de Thérapeutique Clinique. 330 pp. Editions Albert Skira, Genève, 1945.

Principles of Internal Medicine. D. M. Baltzan, Chief of Medicine, St. Paul's Hospital, Saskatchewan. 398 pp., illust. \$5.00. Ryerson Press, Toronto, 1945.

Research in Medicine. Sir Thomas Lewis, Physician in charge of Department of Clinical Research, University College Hospital, London. 102 pp., 2nd ed. 5s. H. K. Lewis & Co. Ltd., London, 1946.

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Zur Physio-Pathologie der Niere. Von Dozent Dr. med. Otto Spühler, Oberarzt der Med. Universitäts-Poliklinik Zürich, mit einem Vorwort von Prof. Dr. med. P. H. Rossier. 248 pp., illust. In Ganzleinen Fr. 17.50, Kart. Fr. 15.60. Medizinischer Verlag Hans Huber, Bern, 1946.

Aids to the Diagnosis and Treatment of Venereal Diseases. T. E. Osmond, Honorary Consultant in Venereal Diseases to the Army. 138 pp. \$1.10. Baillière, Tindall and Cox, London; Macmillan Co. of Canada, Toronto, 1946.

Causation of Appendicitis. A. R. Short, Professor of Surgery, University of Bristol. 79 pp. \$2.25. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1946.

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Solo or Symphony. Shall the Demobilized Doctor Enter Medical Group Practice? Medical Group Practice Council. 44 pp. \$0.25. Medical Administration Service, Inc., New York, 1946.